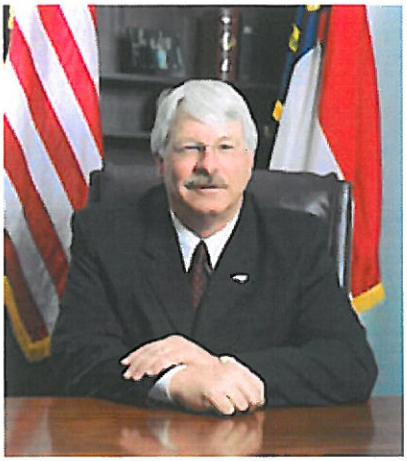
NORTH CAROLINA
DEPARTMENT OF AGRICULTURE
AND
CONSUMER SERVICES

PLANT INDUSTRY DIVISION

2008 – 2009 ANNUAL REPORT

STEVE TROXLER, COMMISSIONER

North Carolina Department of Agriculture and Consumer Services



Steve Troxler
Commissioner of Agriculture
Chairman, Board of Agriculture

Mission Statement

The mission of the North Carolina Department of Agriculture and Consumer Services is to improve the state of agriculture in North Carolina by providing services to farmers and agribusiness, and to serve the citizens of North Carolina by providing services and enforcing laws to protect consumers.

Goals

- **Educate North Carolina's citizens on agriculture's many contributions to the state's economy, history, and future to build awareness of available services and to expand market opportunities through agricultural fairs, news releases, promotional campaigns, public exhibitions, and publication of agricultural statistics.**
- **Protect citizens from consuming unsafe food products and from experiencing economic loss due to unlawful business practices through programs of inspections and enforcement of laws and regulations to build consumer confidence with agricultural and consumer products.**
- **Prevent the spread and effects of agricultural-related diseases and pests, implement eradication steps, and assist farmers in preparing for and responding to catastrophic events through education, site inspections, testing, and emergency planning to maintain a safe environment.**
- **Work to continuously improve the quality and cost-effectiveness of departmental programs and related services provided to North Carolina citizens through performance management and constant monitoring to efficiently manage public resources and maintain high customer satisfaction.**

North Carolina Board of Agriculture

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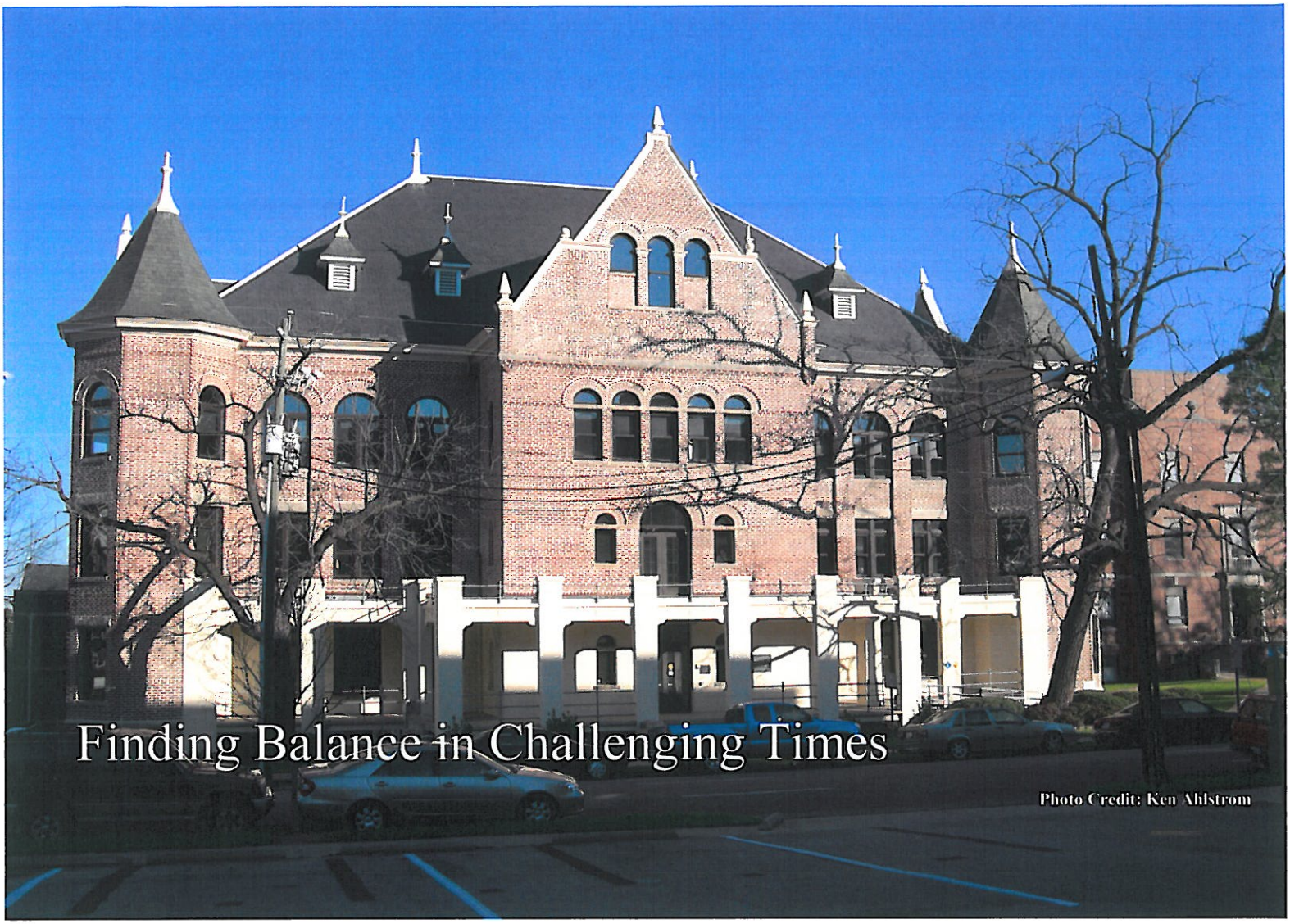


Division Director's Message

One of the critical topics of concern and discussion for this past fiscal year has decidedly been the economy. Both 2008 and 2009 will be long remembered as extremely difficult economic years not only for North Carolina, but for the entire country and world. In addition to the individual tolls this financial crisis has taken on the personal lives of many, it has directly impacted key agricultural programs implemented by the NCDA&CS. Most difficult for the NCDA&CS-Plant Industry Division has been the direct financial impacts on implementation of its mission and core responsibilities. Finding a balance in these challenging times has been difficult. I am reminded of the quote of Jake Penn noting "*One of the secrets in life is to make stepping stones out of stumbling blocks.*" During this time, individuals have learned to overcome adversity and hardship clearly out of necessity. To me, one of the most promising lessons learned has been the continued commitment of staff members willing to assume additional duties and responsibilities in order to accomplish the core Divisional responsibilities. Collectively, we have worked together to find the needed balance in these turbulent times.

For this period, the primary mission of the NCDA&CS-Plant Industry Division continued to focus on assuring that seed and fertilizer, along with soil additives offered for sale in the state meet standards and were truthfully labeled, protecting the state's agriculture and natural resources from introduced plant pests, including insects, diseases, and noxious weeds, and protecting the state's endangered and threatened plants. During the past fiscal year, the NCDA&CS implemented effective Seed and Fertilizer regulatory and service programs designed to ensure seed, fertilizer, and soil additive products met those standards mandated in applicable laws and regulations. Through the work of Seed and Fertilizer field staff, we were able to conduct inspections, sampling, and analysis of seed and fertilizers and to ensure appropriate enforcement actions were taken for products out of compliance. The staff of the N.C. Seed Laboratory conducted purity, germination and numerous other specialized tests on official and service seed samples submitted for analysis.

Within the Plant Protection Section, staff conducted surveillance, monitoring, control and eradication activities for all plant pests, including insects, diseases, and weeds and provided technical support to agricultural and horticultural industries by facilitating interstate and export certification for movement of plants and plant products. Dedicated work continued in protecting the native flora and natural habitats of the state and regulating the wild or native collected plant trade by implementing regulatory programs, conservation, and restoration projects. Program staff also worked to implement biological control programs with the goal of benefiting the environment and the citizens of the state. Apiary Inspection Program staff worked to conserve and enhance honeybees by conducting hive inspections and to mitigate disease or other pests that might directly affect the apiary industry in the state.

The work of the NCDA&CS-Plant Industry Division requires the technical expertise of many individuals working together to develop and implement the regulatory and service programs as mandated by the N.C. General Assembly, Board of Agriculture and Commissioner. The Plant Industry Division staff continues to work to ensure our agricultural producers and citizens have the support that is needed for seed, fertilizer and plant pest regulatory programs.

I sincerely appreciate the continued dedication of each Plant Industry Division staff member and look forward to finding *balance in these challenging times!*

Gene B. Cross
Division Director

Accomplishments – Plant Industry Division
Administrative and Support Services

Administrative Services

During this period, the Plant Industry Division leadership staff jointly participated in our first annual strategic planning session. At this session, the group reviewed a series of critical changes expected to cut across multiple sectors of the U.S. economy, including state and local governments. These changes included globalization, convergence, environmental stability, rising energy and health care costs, transparency, technology use and integration, elections, and talent management. Based on in-depth discussion, the group developed a series of mission critical strategies:

- Human resources and staffing
- Organizational performance
- Financial administration
- Regulatory and service program administration
- Research and technology needs
- Responsiveness to state and local issues

The NCDA&CS-Plant Industry Division state-appropriated budget for 2008-09 was $4,450,383 and included a total staff of 92. The Plant Industry Division continued to work cooperatively with federal and private partners in several cost-share programs with over $1,444,400 obtained in support of plant pest program work. The Plant Industry Division received $792,840 in grant funds from the Natural Heritage Trust Fund that permitted the Plant Conservation Program to purchase new preserves or additional acreage in existing preserves in the state. Plant Industry Division staff forged a new partnership with the USDA-Biotechnology and Regulatory Services by participating in a pilot project to protect North Carolina's agriculture and environment by using a science-based regulatory framework that permits the safe development of federally-regulated genetically engineered organisms. As part of the pilot project, newly trained field staff will actively participate and conduct biotechnology and regulatory inspections and provide reports on field conditions and compliance.

Support Services

The NCDA&CS-Plant Industry Division, Support Operations Facility, located at the Dix Farm Unit, is responsible for providing support for all the Division's programs including maintenance of vehicles, equipment, and personnel needed to meet the established regulatory and service programs. This unit also provides for maintenance of the Division's facilities, assistance with supervision of related construction projects and renovations and assistance with development of specialized equipment utilized in project work.

For FY 2008-09, the Support Operations Unit provided assistance to Plant Industry Division and other divisions within the department, along with other cooperating state and federal agencies. Primary accomplishments include:

- ▶ General Support-Over 100 vehicles were maintained and supplied to program personnel within Plant Industry Division. Diverse program needs required modifications and updates to be frequently made and staff was frequently requested to make urgent changes to meet the needs of individuals involved in treatment and regulatory efforts.
- ▶ Entomological Program Support-For this program, staff provided approximately 30 vehicles for use in program work. Support staff assisted by providing traps and supplies for program surveys. Staff assisted with the European Gypsy Moth Program, including support for treatment on 2,200 acres. Staff assisted in other programs, included, but not limited to Imported Fire Ant, Cooperative Ag Pest Survey, Sweetpotato weevil, and Boll Weevil.

- Regulatory Weed Program Support-Staff provided maintenance and logistical support for the Witchweed program in southeastern North Carolina. Approximately 50 vehicles were supplied for use by temporary staff in the field with servicing by the Raleigh and Whiteville locations. Support Operations assisted in a large effort to eradicate Purple Loosestrife from the Forsyth County area. Staff assisted with a total of five treatments for various noxious weeds.
- Plant Conservation Program Support-Staff assisted the Plant Conservation Program with prescribed burns as well as other cultural practices to benefit unique ecosystems within North Carolina.
- Staff assisted the N.C. Forest Service in responding to the Evans Road fire in Eastern North Carolina by providing vehicles and equipment in support of wildfire suppression activities, as well as developing and installing equipment necessary to meet assigned tasks. A total of six NCDA&CS' staff rotated in and out for a 42-day deployment in support of fire suppression activities. Other logistical needs were provided as well.
- Beneficial Insect Lab-Staff support was provided to the Apiary Inspection Program and with general maintenance and fabrication needs.
- Repair and Renovation Projects- Support Operations personnel have taken active roles this year in repair and renovation activities and projects for facilities throughout the state. These include work with the Plant Industry Greenhouse Facility and Phase I and II work with the Old Health Building renovation.
- Other Partners-Support Operations stores equipment and supplies for numerous agencies within NCDA&CS as well as Federal partners to meet ongoing program needs. Numerous tests and practice sessions were conducted to ensure readiness in case of a disease outbreak. Ongoing research and development of new methods and practices, as well as refinement of existing protocols, have been ongoing throughout the last year. More efficient communications have been added as well through the use of VIPER 800 MHz technology, which is available as needed for regulatory and/or emergency efforts. Support Operations provided training as needed for the effective use of this technology.
- Support Operations staff conducted 12 safety training/seasonal employee orientation sessions, along with implementation of the PureSafety online training program.

Accomplishments: Plant Protection Section

The Plant Protection Section is responsible for implementing laws enacted by the North Carolina General Assembly to protect North Carolina agriculture and its citizens from the entry, establishment, release, and spread of injurious organisms into or within North Carolina.

The mission of the Plant Protection Section is to enhance the quality of life in North Carolina by protecting agriculture and the environment from injurious plant pests, by promoting beneficial organisms, and by protecting rare native plants of the state.

We serve the people of North Carolina by:

- Protecting agricultural crops, horticultural crops and native flora, by preventing or controlling the invasion and spread of injurious insects, plant pathogens, weeds, and other pests of regulatory concern.
- Protecting honey bees by combating the spread of bee pathogens.
- Responding to constantly changing threats to crops, rare native plants, and honey bees by drafting effective and reasonable regulations and by achieving public compliance.
- Supporting agriculture, horticulture and related industries by providing inspection and export services to facilitate the movement of regulated commodities.
- Protecting rare native plants by restoring their habitats, and by propagating and restoring them to the wild.
- Promoting beneficial organisms that serve as biological controls of pest species.
- Providing outstanding service and satisfaction to all our clients.

North Carolina has an extremely wide range of climate, from near tropical along the southeast coast to winter conditions similar to southern Canada in our higher mountains in the west. Such diversity provides suitable environments for an extremely diverse flora and fauna. Extensive international air and sea transportation, both military and commercial, and an extensive Interstate Highway System increase the potential for the accidental introduction of pest organisms into North Carolina. Therefore, North Carolina's Plant Protection Section programs must deal with a wide range of organisms and host-pest interactions.

In 2008 the NCDA&CS-Plant Industry Division, altered its annual reporting cycle to follow the state fiscal year. Major program activities for the period January 1, 2008 through June 30, 2009 included the following:

Apiary Inspection Program

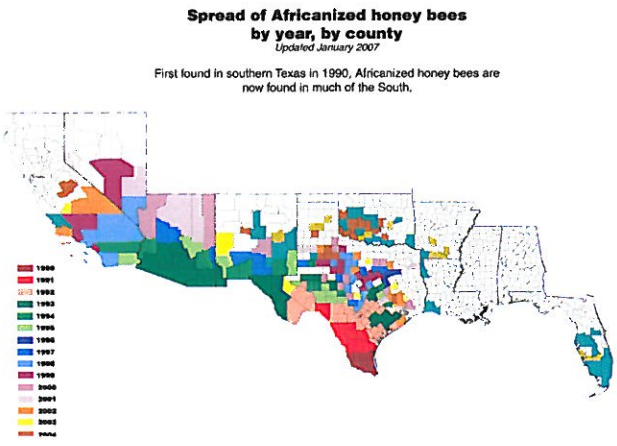
The N.C. beekeeping industry remains viable and strong. Field staff continued to assist beekeepers through field inspections, educational meetings, and field days. Our goal is to continue to improve our overall inspections and in particular our documentation of them. Our ultimate goal is to reduce the rate of honey bee disease and pest problems. The number of colonies inspected during the 2008-09 fiscal year was 6,008, with 35 hives documented to have American Foulbrood. As of June 30, 2009, 56 establishments were permitted to sell bees in North Carolina.

Numerous problems and disorders challenge beekeepers and the industry. Unfortunately, there are several pests, predators and problems that have made this year a difficult one for the beekeepers. One problem that appears to be unique this year is associated with queen acceptance and egg viability. Honey production is expected to be down this year. There are many explanations given for this, but none seem to be reasonable for the varying circumstances.

The *Varroa* mite persists as a major threat to the beekeeping industry in North Carolina and is probably a contributing factor to some of the circumstances already described. Several new products have been registered for use in controlling this pest; however, the mites have developed resistance to some of these materials in short order and rendered these products ineffective. Although chemical treatment of mites may be necessary, some miticides have been demonstrated to have adverse effects on bees. Another perplexing factor is the growing use of unregistered materials that may also have adverse effects on honey bee health and may not be efficacious in controlling mites. This and, in some cases, the improper use of antibiotics to control diseases can further complicate useful treatment regimes.

Colony Collapse Disorder (CCD) continues to be a major topic of discussion by the popular media regarding honey bees and their plight this year. The press coverage has highlighted the value of honey bees to a broader audience and raised awareness of their importance. Due to the restricted parameters described as symptoms of CCD, this disorder has not yet been documented in North Carolina. This is not to say that it has not occurred here, but we have not seen evidence specifically attributable to this condition.

Another threat facing the beekeeping industry of North Carolina is the establishment of Africanized honey bees (AHB) (*Apis mellifera scutellata*) on the eastern seaboard (southern Florida). In North Carolina we are engaged in an outreach program to emergency response personnel to familiarize them to the potential threat of AHB. We are also reaching out to the structural pest industry and its membership. We are collecting samples of bees in order to determine their geographic origin and their propensity for increased defensive behavior. The NCDA&CS and



NCSU are collaborating in conducting this survey. At this time none of the samples collected was determined to be of the AHB type. We are striving to have our inspectors and our lab prepared to deal with any AHB incursion or incident. We encourage beekeepers to please let us know of any colonies that seem to be displaying any unusual or inexplicable defensive behavior so that we can maintain a beekeeping industry in North Carolina that is not threatened by the reputation of this more defensive type of bee.

We continue to enjoy a good working relationship with our friends in the North Carolina State University Apiculture Research and Extension Program. We have had the opportunity to assist them in some of their projects and would like to express our gratitude for their assistance in many of our projects.

Biological Control Programs

Summary of Activities:

- Recovered *Pseudacteon tricuspis* phorid flies at the 2006 release site in Pitt County and *P. curvatus* at the 2007 release site in Scotland County.
- Documented spread of *P. curvatus* from Wake County into Franklin, Granville and Chatham Counties.
- Monitored *P. curvatus* release site in Wayne County.
- Reared ca. 89,000 *Sasajiscymnus tsugae* predator beetles for release on hemlock trees
- Conducted studies with *S. tsugae* from Japan to compare life history parameters with beetles that have been in laboratory production for about 10 years.
- Leased space in our quarantine facility to a cooperator from private industry, and an NCSU researcher.
- Located and monitored colonies of *Cerceris fumipennis*, a solitary wasp to use for early detection of the emerald ash borer
- Conducted field trial to assess simulated feeding damage to kudzu in cooperation with a graduate student at the University of Delaware.

Summary of Quarantine Activities 2008/2009

A total of five shipments of foreign material were received by the NCDA&CS' Insect Quarantine Facility during 2008/2009 and one shipment from previous years remained in the facility.

ID #	SPECIES	FAMILY	STAGE	#	ORIGIN	STATUS
Q02-1	***Lymantria dispar***[1]	Lymantriidae	Larvae	126	NC	Insects dissected with some held in incubator.
Q08-2	***Sasajiscymnus tsugae***[2]	Coccinellidae	Adults/ Eggs/ Larvae	330	Japan	Colony maintained in quarantine for research purposes.
Q08-3	***Striacosta albicosta***[3]	Noctuidae	Egg/larvae	4,059	IA	Insects maintained on artificial diet until pupal stage.
Q08/09 -4	***Cactoblastis cactorum***[3]	Pyralidae	Egg/larvae	9,341	FL	Insects maintained on artificial diet until pupal stage.
Q08-5	***Tetramesa romana***[3]	Eurytomidae	Egg/larvae	60	TX	Insects maintained on artificial diet until pupal stage.
Q09-1	***Adelges tsugae***[4]	Coccinellidae	Adults/ Eggs/larvae	200	OR, WA	Colony maintained in quarantine for research purposes.

[1]Gypsy moth cadavers which may contain resting spores of *Entomophaga maimaiga* are being kept for potential use in infecting populations of gypsy moth to slow their spread.

[2]*Sasajiscymnus tsugae* beetles shipped from Japan in 2008 were reared in quarantine for comparison and subsequent mating with the mass reared beetles to improve rearing stock. *S. tsugae* beetles are mass reared for release in the North Carolina mountains to control the hemlock wooly adelgid (*Adelges tsugae*).

[3]Dr. Allen Cohen, Insect Diet & Rearing Research, LLC, is utilizing the NCDA&CS' Beneficial Insects Quarantine Lab to develop artificial diets and rearing systems for *Cactoblastis cactorum* (prickly pear cactus moth), *Striacosta albicosta* (western bean cutworm), and *Tetramesa romana* (*Arundo* wasp).

[4]Kelly Felderhoff, graduate student at NCSU is comparing the western U.S. population of hemlock wooly adelgid with the eastern population under the direction of Dr. Fred Hain.

Cerceris fumipennis in North Carolina

The native ground-dwelling wasp, *Cerceris fumipennis,* provisions its nest with buprestids, including the invasive forest pest Emerald Ash Borer (EAB) (*Agrilus planipennis*) when present. The wasp is much more efficient than humans at finding EAB, and is proving to be a reliable way to monitor for this pest. It is a solitary, ground-nesting wasp that lives in diffuse colonies in sparsely vegetated, open spaces with hard-packed, sandy soil. Colonies are almost always found in full sunshine near wooded areas in places of human disturbance (fire-pits, campsites, road and trail edges, informal parking lots, playgrounds, and baseball diamonds). In 2008, the Beneficial Insects Laboratory of the NCDA&CS initiated a project to locate nests of *C. fumipennis* for use in surveying for EAB and other pest buprestids.

A total of 32 site visits were made between 9 April and 31August 2008; 21 of these were in Wake County, three in Stanley County, two in Alamance County and one each in Chowan, Granville, Randolph, Rockingham, Surry and Warren Counties. *Cerceris fumipennis* was confirmed at two sites: A city park in Raleigh (Wake County – permission obtained from the Raleigh Parks and Recreation Department), and on private property in Snow Camp (Alamance County). In both cases, it was late in the season (mid-late August). Although a large number of potential nests were found in both sites it is uncertain how many of these were *C. fumipennis*. The nests of other burrowing insects were also present (different species of ground dwelling wasps, tiger beetle larvae). In the few *C. fumipennis* flights observed, no prey was being carried back to the nest.

Prior to 30 June 2009, 29 baseball diamonds in 16 sites in the North Carolina piedmont were surveyed for *C. fumipennis* nests. Six of these fields were positive for the wasp, but of these, four had just one or two nests. The wasps were monitored and their prey beetles collected in three sites in Raleigh. The work is ongoing.

***Cerceris fumipennis* nest with buprestid prey (circled), Gaston County, N.C. 2009.**

Hemlock Woolly Adelgid Predator Rearing 2008-2009

The hemlock woolly adelgid occurs over multiple states, and is now distributed throughout the native range of the eastern and Carolina hemlock species. Hemlock is widespread in National and State Forests and Parks, and the loss of the hemlock would bring about a major change to the ecology of those areas. In addition to a loss of a unique ecosystem, dead and dying trees are a safety hazard in recreation areas, as well as aesthetically unattractive.

The primary objective for this project was for NCDA&CS to operate a large-scale central rearing facility to provide biological control agents for the management of hemlock woolly adelgid (HWA). *Sasajiscymnus tsugae* (St), native to Japan has been in mass production at the lab since December 2002. In May and July of 2008, newly collected *S. tsugae* from Japan were received in our quarantine facility to broaden the gene pool in the colony. Additionally, a small colony (25 adults) of a second species of predator, *Scymnus sinuanodulus* was obtained January 2007 from Mike Montgomery of the Forest Service in Connecticut for rearing on an experimental basis.

Figure 1. Hemlock woolly adelgid ovisacs.

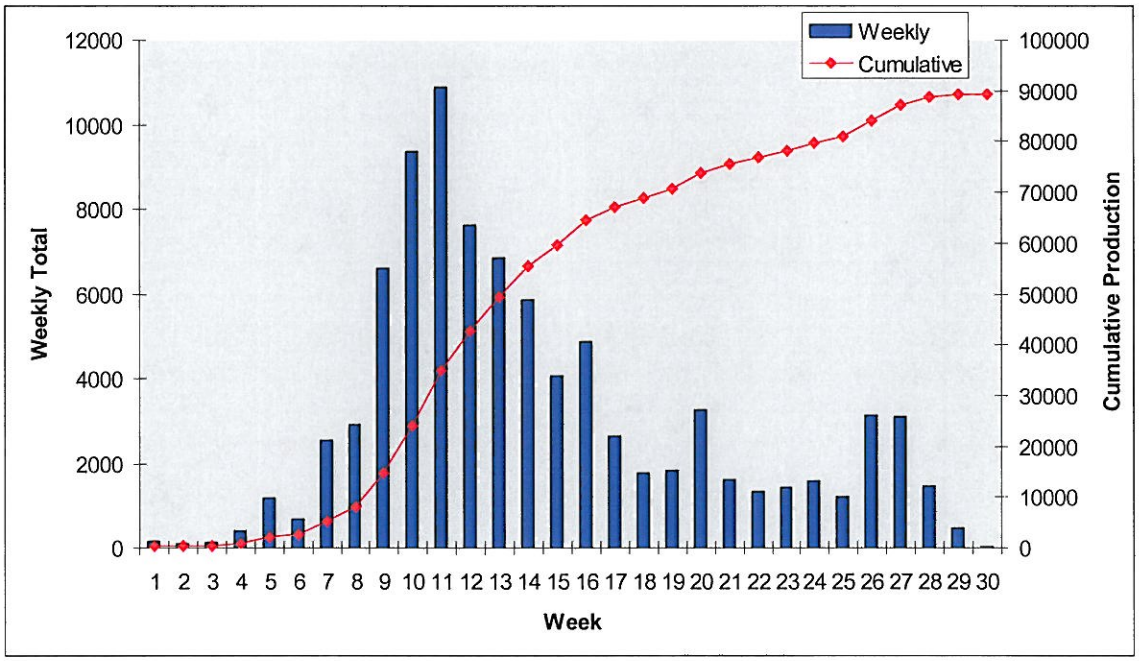
The predator beetles are well synchronized with the lifecycle of the adelgid. After a summer of aestivation, the adelgid begins to mature and prepare for oviposition. Once this maturation begins in the field, adelgid on hemlock boughs which are cut and stored in spring-like conditions begin laying eggs (Fig. 1). This stimulates reproduction in the St, and the mass rearing can proceed. Rearing continues until the adelgid completes two generations, usually by June, and aestivates as nymphs on new hemlock growth.

For mass production of the colony, mating groups of beetles were placed in 3.8 l jars supplied with a bouquet of hemlock twigs (Fig. 2). Eggs (on the twigs) were removed weekly and put in rearing cages supplied with infested hemlock. Infested twigs and water were supplied and after four weeks, adult beetles collected and moved into storage cages. Oviposition jars for the 2008-2009 season were set up beginning November 20, with numbers increasing as egg laying increased. Beetles produced in this way are packed into paper buckets and turned over to USDA – FS personnel on a bi-weekly basis, for release at selected field sites.

Figure 2. *Sasajiscymnus tsugae* oviposition jars and rearing cages.

A total of 74,055 predator beetles were produced by the "old" colony (Fig. 3). Of these, 70,000 were distributed to the Forest Service for release. The remainder was kept for the summer and will be used to restart the colony in the fall.

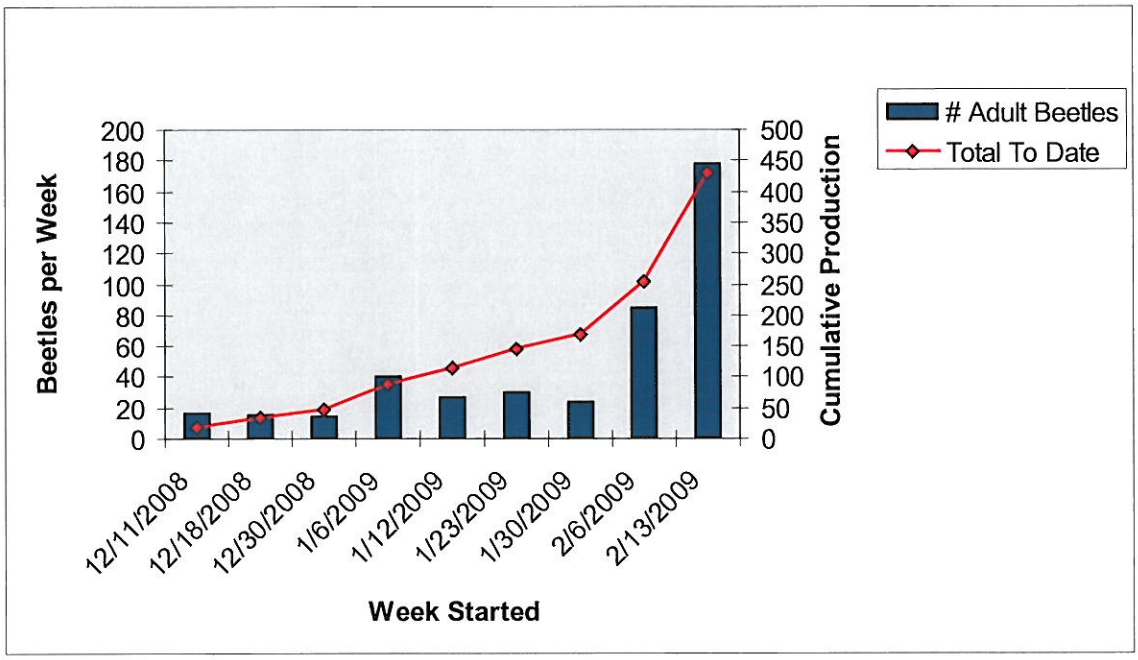
Figure 3. Production of *Sasajiscymnus tsugae* (old and new beetles) 2008-2009. Production started 20 November, 2008, last week of oviposition was 8 June, 2009.



Japanese collection. *Sasajiscymnus tsugae* that were collected in Nara and Osaka Prefectures, Japan, were received from Ashley Lamb of Virginia Tech in May and July 2008. Single pair matings with 60 of the adults were conducted in the quarantine facility to obtain F1 beetles. Adults used in these matings and samples of their offspring were examined by Leellen Solter, Illinois Natural History Survey to determine the presence of microsporidia or other pathogens. Only one beetle was positive, and all of its offspring were destroyed. A sample of the beetles that developed on the shipped material was also examined and found negative for pathogens. The remaining beetles were held in the quarantine facility of NCDA&CS, and studies on their life history in the lab were initiated in December. Before mixing them with the general colony population, single pair matings were conducted, and comparisons of factors such as development time, fecundity, longevity, and host seeking behavior were made to beetles from the existing colony. Data are being analyzed at this time. Additionally, mating groups were set up in oviposition jars to increase the colony of "new" St beetles. Approximately 15,500 beetles were produced, with 7500 released and 8000 kept to maintain the colony and distribute to other state rearing labs.

Other predators. Efforts to rear *Scymnus sinuanodulus* resulted in about 200 new adults at the end of the 2007-08 season. Some mortality occurred over the summer, but new mating groups were established in the early winter. All adults produced (431) were sent to the University of Georgia to add to their colony (Fig. 4). This work was undertaken to learn more about this beetle and its behavior in a small scale rearing experiment.

Figure 4. Production of *Scymnus sinuanodulus* 2008-2009.



Status of the field release and monitoring of phorid flies *Pseudacteon* spp (Diptera: Phoridae) for imported fire ant control

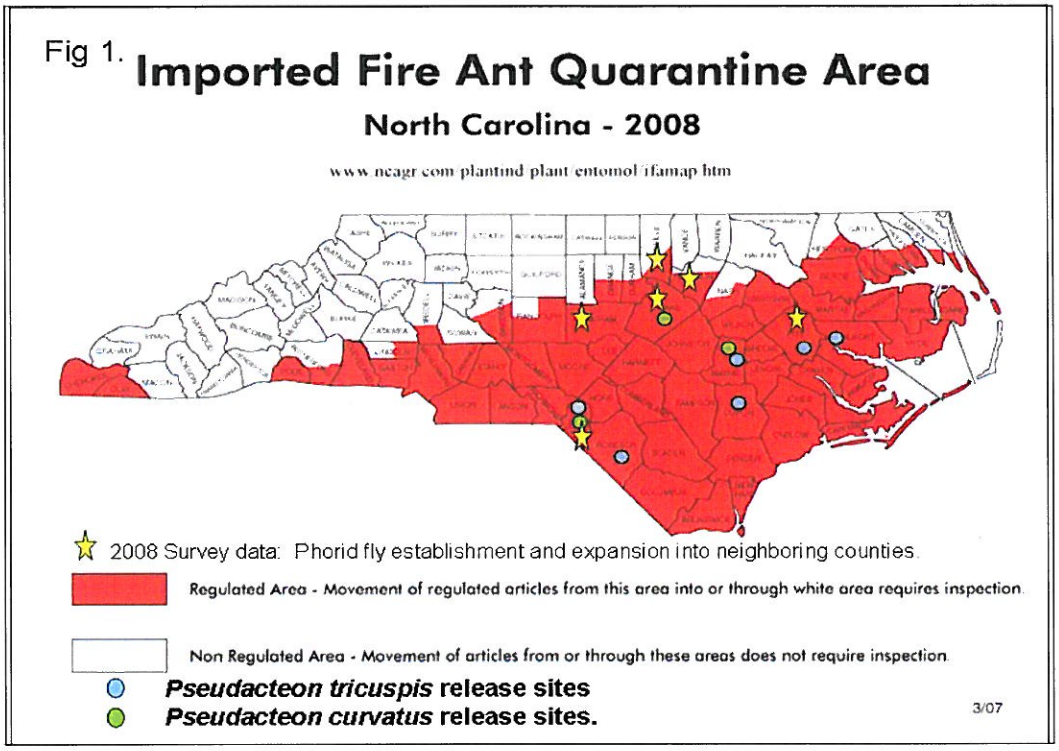
The release of phorid flies in North Carolina for biocontrol of imported fire ant (IFA) was initiated in 2000 as a cooperative effort between NCDA&CS and USDA-ARS. Since then two phorid fly species *Pseudacteon tricuspis* and *P. curvatus* have been released in this state (Fig 1).

The species of phorid flies released at each locality are based on the most prevalent ant colonies present: monogyne colonies with one queen or polygyne colonies with multiple queens. *P. tricuspis* flies typically attack larger workers found in the monogyne colonies whereas *P. curvatus* shows a preference for smaller workers common to polygyne colonies.

Pseudacteon curvatus: *P. curvatus* is showing more potential for establishment in North Carolina than *P. tricuspis*. Less than three years after their initial release in Wake County, the phorid flies have spread to Chatham, Franklin and Granville Counties. The flies appear to be following the northern movement of the imported fire ant infestation. Phorid flies were found one year after their 2007 release in Scotland County and found in Wayne County in the fall after their release in late April and early May. Delimiting surveys to monitor establishment and spread are planned for the fall.

Pseudacteon tricuspis: In 2008, the only sustained *P. tricuspis* populations were found at the 2006 Pitt County release site. At this site phorid flies were observed at 18 of the 22

mounds surveyed. A survey to determine dispersal from the release site is planned for the fall of 2009.



Kudzu Natural Enemy Host Testing

Kudzu (*Pueraria montana* (Lour.) Merr. var. *lobata* (Willd.) Maesen & Almeida) is a common weed in the southeastern United States. Native to Asia, this plant is widely used for food and fiber. Kudzu was introduced to the U.S. in 1876, and planted first as an ornamental then as a forage crop and to prevent soil erosion along roadsides and railroad embankments. Kudzu is now widely acknowledged as a major weed of forests and rights of way in the southeast, and many herbicides are labeled for kudzu control on such sites. Because infestations may be extensive, remote, on marginal lands, or in environmentally sensitive areas where herbicide applications are not feasible, classical biological control of kudzu is being explored.

Several insects have been identified in China feeding on leaves, stems and roots of kudzu. Some agents have been tested in the country of origin, but shipments to quarantine facilities in the U.S, for host plant testing have been problematic. In order to better target vulnerable stages and parts of the kudzu plants, a test of simulated wounding is proposed.

Kudzu is a widespread problem across the southeast, affecting nursery plantations of forest species. The weed is also thriving outside of the southeast with infestations found in the eastern U.S. as far north as Massachusetts, and in parts of the Pacific Northwest. Much of the kudzu currently found in the southeast was planted at the encouragement and with the assistance of the U.S. Department of Agriculture. The assistance of the federal government is needed for exploration to discover natural enemies in the native range of kudzu, and to establish a systematic program of testing these natural enemies to determine their suitability for a biological control program.

Kudzu plants were grown from stem cuttings and transplanted to a field near Butner, North Carolina. In addition, crowns of undetermined age were isolated, measured and their vines were subjected to a regular schedule of artificial wounding to simulate insect herbivory on foliage, stems and crowns over one or two growing seasons.

Matthew Frye, a graduate student at the University of Delaware working under the direction of Judith Hough-Goldstein, planned these studies as a supplement to his own work conducted in Delaware. A temporary technician was hired to perform daily tasks for the duration of the project. Data were collected from the plants that were already established, and include crown size, leaf and stem biomass, and number of nodes. Data will be compiled and analyzed by Matt Frye. A final season of field data is currently being collected.

Kudzu plot at Butner, North Carolina, 2008, established crowns.

Cooperative Agriculture Pest Survey (CAPS) Program

The Cooperative Agricultural Pest Survey (CAPS) is a joint initiative between the USDA-APHIS-PPQ and the NCDA&CS to fund and implement domestic surveys of harmful or economically significant plant pests and weeds that have not been detected by front-line inspections at our ports of entry. These surveys are necessary to safeguard our nation's agricultural and natural resources by detecting early pest infestations or introductions which validates our trading partners concerns for pest status. Typical surveys target exotic pests, pests of export significance and pests that are not known to occur in the U.S., but can also include regionally established pests. A strong domestic pest detection infrastructure and headquarters/regional staff is vital to ensuring that scientifically valid, current, and reliable pest/disease survey data is available on a continuing basis. Additionally, staff support is also critical at the state level and federal funding provided for a State CAPS Survey Coordinator position to be housed within the NCDA&CS' Plant Industry, Plant Protection Section.

The State CAPS Committee met twice at the NCDA&CS' Biocontrol Laboratory in Cary on June 4th and June 23rd.

In anticipation of the trapping plans to be formulated for 2008, the State Survey Coordinator (SSC) was present at a section meeting of all of the state Plant Pest Specialists held in Greensboro. He gave a presentation on the status of the European Wood Wasp and Light Brown Apple Moth, two programs which are to receive much attention in the 2008 trapping season. Several Plant Pest Specialists offered to assist in any trapping to be done for these two pests and others if needed.

In September and throughout the rest of the year, samples collected in the field were examined for the presence of any of the target organisms for which surveys were conducted. None of the targets were found. The State Survey Coordinator attended the Southern Plant Board meeting in Nashville, Tennessee during April. He also attended the National CAPS Meeting Dec. 3-4, 2008 in Phoenix.

The SSC also coordinated all trapping programs in North Carolina including the National Light Brown Apple Moth Survey.

All data collected from the year's surveys has been entered into the NAPIS database.

Emerald Ash Borer

Research has developed a trap that is attractive to beetles in the family Buprestidae including Emerald Ash Borer (EAB). The trap is a prism trap consisting of three 14" x 24" panes, with several holes for trap and lure attachment. The trap is constructed of a corrugated plastic in a stock purple color. The lure is an attractant compound called Manuka oil and is placed in pouch with a release rate of 50mg/day. The pouch has a 60-day life expectancy.

Emerald ash borers attack only ash trees and therefore traps are placed in ash trees when available, or as close as possible to a host ash. If possible, trees eight inches or greater in diameter should be selected. Traps are located along edges of woods, in open areas, or in open stands such as parks and should be placed on the sunny side of the tree. Traps should be hung as high as possible but no lower than five feet above the ground.

Research indicates that initial emergence of EAB occurs after the accumulation of 450 growing degree days (base 50°F). The same research indicates that peak emergence is reached in 900-1100 growing degree days. In North Carolina the trapping season would be the end of April until approximately July 1st.

Because of the late arrival of traps in 2008, traps were set out the first week of June and retrieved the first week of September with a lure replacement at the end of July. Because ash is a minor plant in North Carolina, traps were put out at one per site. Twenty sites were selected. These included 17 nurseries, two state parks, and one Welcome Center. No emerald ash borer specimens were found in any trap.

Exotic Cotton Lepidoptera

Pests surveyed were Egyptian Cotton Leafworm (ECL), Rice Cutworm (RC), False Codling Moth (FCM), and Old World Bollworm (OWB). Wing traps were placed in cotton fields. Pheromones were supplied by USDA-APHIS-PPQ from the Otis Methods Development Laboratory.

ECL is native to the Mediterranean area, the Middle East, and much of Africa. RC is found in Asia and Africa; FCM is endemic to sub-Saharan Africa. OWB can be found in Africa, Asia, Australia, the western Pacific region, and the Middle East. All of these pests are highly polyphagous and combined can infest over 40 families of plants. Since cotton is a major crop in North Carolina, and these pests pose a real threat to that crop resulting in significant yield losses if they become established. Traps were placed at 40 sites in 22 counties (Anson, Beaufort, Bertie, Cleveland, Craven, Edgecombe, Greene, Halifax, Hyde, Johnston, Lenoir, Martin, Nash, Northampton, Pitt, Richmond, Stanly, Union, Wake, Warren, Wayne, and Wilson).

The trapping season began in June and lasted through August. Traps were serviced twice during the growing season with the lure changed once. During servicing, traps were examined for any suspect specimens trapped in the sticky material inside the traps. In some cases, lures were combined. Fields were selected and one trap was placed per field.

One hundred twenty samples from 40 traps were examined by the State Survey Coordinator.

None of the target specimens were found in any of the traps.

Exotic Fruit Lepidoptera

Pests surveyed were Light Brown Apple Moth, Fruit Tree Tortrix Moth, Summer Fruit Tortrix Moth, Apple Ermine Moth, and Cherry Ermine Moth. Surveys were conducted using wing traps, delta traps, and pheromones. As much as possible, abandoned orchards were selected and two traps were placed in each orchard. The first four listed (LBAM, FTTM, SFTM, AEM) have apple as one of their hosts; CEM feeds on *Prunus* species which includes peaches and plums.

1. Light Brown Apple Moth
This moth is a highly polyphagous pest of over 120 plant genera in over 50 families with a preference for hosts in the Compositae, Leguminosae, Polygonaceae, and Rosaceae. Some host plants are: apple, blueberry, camellia, grape, oak, persimmon, pine, potato, strawberry, and viburnum. This pest has been found in California and is now under quarantine in that state. Primary and secondary hosts of this pest occur in North Carolina, especially apple, peach, and blueberry. The establishment of this pest would pose a serious economic threat in fruit-growing areas of the state. Because North Carolina has a thriving export program, any yield losses would have a deleterious on the livelihood of the growers. Traps were placed at 76 sites in 12 counties (Avery, Bladen, Buncombe, Duplin, Haywood, Henderson, Jackson, Mitchell, Montgomery, Pender, Sampson, and Wilkes).

2. Fruit Tree Tortrix Moth
This moth pest is currently established in British Columbia and was trapped in Washington state. Some of its hosts are apple, plum, and blueberry. In addition, this moth is capable of feeding on many forest and ornamental trees including maple, oak, elm, walnut, birch,

hawthorn, and many others. Primary and secondary hosts of this pest occur in North Carolina. The establishment of this pest would pose a serious economic threat in fruit-growing areas of the state. Because North Carolina has a thriving export program, any yield losses would have a deleterious on the livelihood of the growers. Traps were placed at 76 sites in 12 counties (Avery, Bladen, Buncombe, Duplin, Haywood, Henderson, Jackson, Mitchell, Montgomery, Pender, Sampson, and Wilkes).

3. Summer Fruit Tortrix Moth
This moth pest has two generations per year and is a serious pest of apples, pears, and peaches. The first generation larvae feed on the leaves and flowers of host plants with adult emergence occurring in June. Second generation larvae feed on the fruit. Adult emergence occurs in August. At the present time this pest does not occur in the U.S. Primary and secondary hosts of this pest occur in North Carolina. The establishment of this pest would pose a serious economic threat in fruit-growing areas of the state. Because North Carolina has a thriving export program, any yield losses would have a deleterious on the livelihood of the growers. Traps were placed at 76 sites in 12 counties (Avery, Bladen, Buncombe, Duplin, Haywood, Henderson, Jackson, Mitchell, Montgomery, Pender, Sampson, and Wilkes).

4. Apple Ermine Moth
This moth pest has one generation per year and is a serious pest of all varieties of apples. A native of Eurasia, it was discovered near Bellingham, Washington in 1985. By 1992 it had spread throughout Washington and northern Oregon. Its larvae feed mainly on leaves and can seriously defoliate apple trees in a matter of a few weeks. The larvae feed gregariously within a web similar to eastern tent caterpillar and fall webworm. Visual inspections were done in addition to trap placement. Because North Carolina has a thriving export program, any yield losses would have a deleterious on the livelihood of the growers. Traps were placed at 18 sites in 8 counties (Avery, Buncombe, Duplin, Haywood, Henderson, Jackson, Mitchell, and Wilkes).

5. Cherry Ermine Moth
This moth pest is identical in appearance to the Apple Ermine Moth but is found on different hosts--mainly *Prunus* species, which includes peach and plum. It is now found in seven northwestern counties of Washington state and is established in southwestern British Columbia and Vancouver Island in Canada. Like the larvae of the Apple Ermine Moth, larvae of this moth also feed gregariously within a web. Visual inspections were conducted and pheromone-baited wing traps were placed at four sites in Montgomery County.

The trapping season began in June and lasted through September. Traps were serviced twice during the growing season with the lure changed once. During servicing, traps were examined for any suspect specimens trapped in the sticky material inside the traps. In some cases, lures were combined. There were two traps placed in each orchard.

Two hundred sixty samples from 152 traps were examined by the State Survey Coordinator.

None of the target specimens were found in any of the traps.

Exotic Bark Beetles and Exotic Wood Wasps

Surveys for these pests were conducted using both Lindgren funnel traps and IPM Tech Intercept Panel traps. Traps were fitted with the "wet option" for collections. Traps were

placed in locations where pines were found and were selected on their proximity to sites having public access, i.e. campgrounds, race tracks, parks, wood pulp processing plants, and

in some cases, in tree nurseries. Lures used were alpha-pinene for the bark beetles and the *Sirex noctilio* attractant.

Bark beetles and wood wasps, at the present time, do not have sex pheromones that have been developed in the laboratory. Consequently, attractants are used that mimic the odors produced by stressed pine trees. Bark beetle attractant was piggy-backed on the *Sirex* traps.

The optimum time to survey for bark beetles is in late winter and early spring. However, USDA-APHIS-PPQ has been doing the bulk of the survey for beetles. For *Sirex* and other wood wasps, the optimum time for trapping is August through October. Traps were placed in the field at the end of July 2008.

Traps were serviced at approximately two intervals because after two weeks, the insects begin to disintegrate and are more difficult to sort and identify. Traps were placed at 51 sites in 33 counties (Burke, Cabarrus, Caldwell, Camden, Craven, Cumberland, Davidson, Duplin, Durham, Franklin, Granville, Guilford, Halifax, Harnett, Henderson, Iredell, Johnston, McDowell, Mecklenburg, Nash, Northampton, Orange, Pender, Richmond, Rutherford, Vance, Wake, Warren, Washington, Watauga, Wayne, and Wilkes). In counties where multiple traps were placed, they were more than one mile apart.

Two hundred fifty-six samples from 51 traps were examined by the State Survey Coordinator.

None of the target specimens were found in any of the traps.

Soybean Pests: Soybean Aphid and Soybean Pod Borer

Visual surveys conducted were conducted for these pests.

There are no traps or pheromones developed for these pests, so surveys are conducted visually during the soybean growing season in North Carolina. Since the soybean aphid needs an alternate host on which to overwinter and that host doesn't occur in North Carolina, aphids are not present until late in the year (October and November) when they have spread into North Carolina from Virginia. The soybean pod borer lays its eggs in or near flower buds. After hatching the larvae bore into the buds and seed pods, active larvae maintain exit holes to the outside. Visual examination of the developing pods is the only way to detect this pest.

Leaf samples were collected from soybean plants visually inspected and brought to the SSC who confirmed the presence of Soybean Aphid.

There was no indication that the Soybean Pod Borer is present. However, Soybean Aphid was detected in soybean fields in six North Carolina counties (Edgecombe, Gates, Halifax, Nash, Perquimans, and Warren). Because the aphid was detected late in the growing season, there was no discernible damage to the soybean crop.

LBAM National Survey

As part of the LBAM National Survey Program, North Carolina was given the task of trapping at 175 sites throughout the state. These traps were to be placed at commercial nursery sites and the trapping timeframe was from July 1st until November 3rd 2008.

Traps were set and monitored according to the work plan. The state was divided into three regions: Coastal Plain, Piedmont, and Mountains. Three people (Plant Pest Aides) were hired, one from each region, to install and monitor the traps during the trapping timeframe. Each trapper was given a comprehensive list of nurseries occurring in their area and were told to select 60-65 locations from the list. The end result of the trapping is as follows:

Coastal Plain - Sixty nurseries in 20 counties (Beaufort, Bladen, Brunswick, Carteret, Columbus, Craven, Cumberland, Duplin, Greene, Hyde, Jones, Lenoir, New Hanover, Onslow, Pamlico, Pender, Pitt, Robeson, Sampson, and Wayne) were trapped.

Piedmont – Sixty-one nurseries were trapped in 10 counties (Chatham, Durham, Franklin, Granville, Harnett, Johnston, Person, Orange, Vance, and Wake).

Mountains - Thirty nurseries in three counties (Alleghany, Ashe, and Watauga) were trapped. For adult male trapping, the Jackson fruit fly trap was used. Traps were hung on or near host plants in the nursery. The components of the female sex pheromone used are (E)-11-tetradecenyl acetate and (E,E)-9,11-tetradecadienyl acetate used in a 20:1 ratio at a three mg dose per septum. The pheromone is dispensed on rubber septa distributed by the USDA-APHIS-PPQ-CPHST Laboratory at Otis Air Force Base, Massachusetts. The septum is placed in the center of the sticky card on the bottom of the trap.

Due to the highly polyphagous nature of LBAM, many states in the United States contain at least one of the many primary or secondary hosts of LBAM. The host map for LBAM gives an overview of LBAM distribution in the United States based on six primary and thirteen secondary hosts. Based on the information available, there do not appear to be areas within the continental United States where LBAM is less likely to occur based on the prevalence of preferred hosts and temperature. In addition, information from regions where LBAM is established (England, New Zealand, Australia) was analyzed and LBAM has only been reported in USDA Plant Hardiness zones 7 and above. Therefore, regions of the United

States in USDA Plant Hardiness zones 1-6 may have a less likely chance of LBAM establishment. These areas, however, are not to be considered excluded from possible establishment.

Traps were checked every two weeks and the lures should be changed every six weeks. Traps with removable bottoms or inserts should be changed as needed. Survey dates in North Carolina were July 31st - November 20th 2008.

1267 trap bottoms were collected from traps and sent for identification to Dr. Ken Ahlstrom, SSC North Carolina who has over 30 years of taxonomic expertise with insects.

No Light Brown Apple Moths were found in North Carolina.

Entomological Programs

Movement of Live Insects for Research or Commercial Purposes

The NCDA&CS evaluated and approved federal applications, PPQ Permit Number 526, for the movement of live plant pests into North Carolina for 3,529 lots of insects, including 1,422 different species. The large number applications to move plant pests into North Carolina reflects the continued market in commercial production, sale, and movement of butterflies and other insects for education, outdoor weddings, and other functions, in addition to the substantial amount of scientific research conducted in North Carolina's academic and private institutions.

Boll Weevil Eradication Program

Cotton acreage for 2008 was 424,374 acres. Cotton was grown in 56 counties. There were 11,162 traps installed on 18,316 cotton fields. There was an average of 48 acres per trap. Trap installation began August 1, 2008 and trap removal was completed November 30, 2008. Eleven contractors, three quality control, and one program manager assisted with trapping and quality control during the 2008 season.

Boll Weevil Capture

No boll weevils were captured during the 2008 cotton-growing season.

North Carolina Boll Weevil Assessment Information
(As of June 30, 2009)

	2008	2007	2006
Number of Acres	424,405	498,530	862,677
Number of Growers	1,816	2,047	2,791
Acre Assessment	$2.10	$2.50	$3.25
Assessments Due	$891,250	$1,246,104.41	$2,803,700.20

2008 Boll Weevil Trapping Data		
Unit	**Counties**	**# Traps**
1	Northampton, Hertford	1,178
2	Gates, Chowan, Perquimans, Pasquotank, Camden, Currituck	
3	Halifax, Warren	1,187
4	Bertie, Martin	1,479
5	Franklin, Nash, Edgecombe, Wilson	1,208
6	Pitt, Beaufort	728
7	Washington, Hyde, Tyrrell, Dare	489
8	Craven, Pamlico, Carteret, Jones	395
9	Johnston, Lee, Harnett, Cumberland	688
10	Wayne, Greene, Lenoir	895
11	Sampson, Duplin, Pender, Onslow	680
12	Roberson, Bladen, Columbus	395
13	Hoke, Scotland	375
14	Richmond, Anson, Union, Stanley, Cabarrus, Davidson, Rowan, Montgomery, Cleveland, Rutherford, Lincoln, Catawba, Iredell	460

Imported Fire Ant Survey and Monitoring Program

The red imported fire ant (RIFA) continued to spread into new areas in North Carolina in 2008-2009. Results from the 2008 surveys resulted in revisions to the IFA quarantine for the 2009 calendar year. Those recommendations were published in early January 2009, and included the addition of the following:

- Camden County – The entire county.
- Chowan – The entire county.
- Franklin County – The entire county
- Gates- The entire county
- Nash- The entire county
- Perquimans- The entire county
- Pasquotank- The entire county
- Randolph- The entire county
- Halifax- That portion southeast of Highway 258 from the Edgecombe County line on to the Northampton County line
- Hertford- That portion south of Highway 158 from the Northampton County line to the Gates County line
- Northampton- That portion southeast of Highway 258 from the Halifax County line to the Hertford County line
- Rowan- That portion south of Highway 70 from the Iredell County line to the Davidson County line

Four temporary employees surveyed along the existing quarantine line in 45 counties. The table below summarizes the 2008-2009 RIFA temporary employee survey efforts.

RIFA Work Completed From July 1, 2008-June 30, 2009

RIFA Survey Totals by County

County	Sum of Miles Surveyed	Sum of Acres Surveyed	Sum of New Sites
Alamance	990	144	79
Alexander	564	134	1
Buncombe	1120	118	3
Burke	1760	143	4
Caldwell	457	24	3
Camden	423	56	23
Catawba	2201	181	36
Currituck	166	20	4
Davidson	794	57	8
Davie	493	80	4
Durham	188	22	9
Forsyth	154	26	2
Franklin	134	17	5
Gates	616	86	38

Graham	343	50	44
Granville	854	415	132
Guildford	895	141	46
Halfax	1571	133	27
Haywood	53	27	
Henderson	1006	232	7
Hertford	584	386	90
Iredell	794	261	75
Jackson	2453	890	55
Lincoln	636	86	12
Macon	1277	312	123
McDowell	1247	68	75
Mitchell	74	6	1
Nash	56	2	
Northamption	982	172	33
Orange	703	47	34
Pasquotank	211	21	13
Perquimans	29	11	5
Randolph	136	29	14
Rowan	874	147	80
Rutherford	1367	138	97
Sampson	138	35	18
Swain	818	103	60
Transylvania	720	68	6
Vance	1794	437	97
Warren	1790	155	18
	31465	**5480**	**1381**

Thirty-six imported fire ant inspection blitzes were carried out at North Carolina weigh stations in support of the federal fire ant quarantine on movement of articles regulated by the quarantine. Approximately 246 trucks were inspected and over 70 media/soil samples were collected for analysis. Additionally, four potted media samples were taken from nurseries under IFA quarantine compliance to determine if bifenthrin was properly incorporated. Several paperwork violations both in-state and out-of-state were addressed. There were approximately 50 people educated on the IFA Program during six IFA presentations given throughout the state for various agricultural agencies. The IFA Quarantine Program responded to more than 200 calls and requests for information that came in from consumers during this reporting period.

Sweetpotato Weevil Trapping Program

NCDA&CS' personnel continue the statewide comprehensive sweetpotato weevil trapping survey on all commercially grown sweet potato fields. Traps containing the female sweetpotato weevil's pheromone were placed at the rate of one trap per ten acres with a minimum of two traps per field. In 2008, 7,921 traps were set in 3,422 fields on approximately 34,505 acres. The traps in all the commercial production areas were negative for 2008. Forty-two thousand three hundred

fifty-one acres of sweet potatoes in 5,529 fields were planted in 2009. Results from the 2009 trapping season will be available in October.

Storage facilities continue to be monitored on a year-round basis with one trap placed in each section of the storage house and an additional trap stationed outside the principal entrance. No sweetpotato weevils were captured during the 2008-2009 fiscal year.

2009 Blueberry Export Certification Program

The Canadian Food Inspection Agency requires that all fresh blueberries shipped to Canada come from growers who participate in a Blueberry Certification Program. The program consists of monitoring and control procedures for the blueberry maggot, *Rhagoletis mendax.* Forty-eight North Carolina production areas were monitored (5,173 acres total representing 92 fields) throughout the harvesting and shipping period and were issued certification documents. No blueberry maggots were detected in any of the fresh market blueberries being shipped to Canada in 2009.

2009 Gypsy Moth Slow the Spread (STS) and Eradication Program

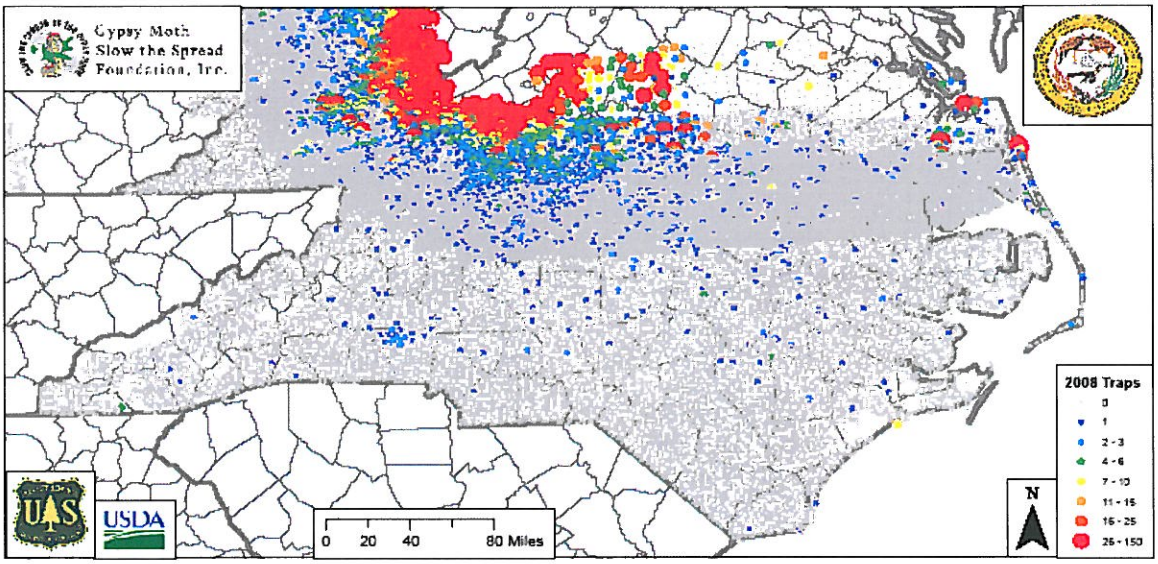
In 2009 the North Carolina Department of Agriculture and Consumer Services' Plant Industry Division carried out an extensive survey, treatment, and regulatory program for Gypsy Moth. The program was divided into two separate areas, Slow the Spread and Eradication.

Gypsy Moth Trapping Program, Results (September, 2008)

In the Slow the Spread area, traps were placed on a 2-kilometer base grid with 1-Kilometer and 500-meter delimit grids in areas that had high catches or treatments in 2007. The Slow the Spread area was divided into 24 separate trapping bid units. Nine private contractors placed and pulled 7,552 traps at an average cost of $17.63 per trap.

The Statewide traps were placed on a 3-kilometer base grid with 500-meter grids in areas of concern. The North Carolina Forest service placed 3,289 traps in 28 counties in the Eradication program. Fifteen temporary employees and 20 field specialists set traps in the remaining counties. Between the STS and statewide programs, a total of 19,647 traps were deployed in 2008 with 1,048 moths caught in 517 positive traps.

Areas of concern include: the Winston-Salem block, left untreated two years prior because of budget limitations. It was trapped on a 500 meter grid, and several traps were positive. The Hubert quad (Hammocks Beach State Park's Bear Island) had several catches above 10. These areas are being monitored by delimiting grids in 2009. The delimiting grid placed around NCDA&CS' Support Operations (Raleigh) was negative.



Nursery Certification Program

NCDA&CS' Plant Protection Specialists inspected 2,826 nursery dealers and 1,761 nurseries during the 2008-09 season. Seven Stop Sale/Movement notices were issued to prevent the sale of infected or prohibited plants. These plants were either treated or destroyed.

Number of Nurseries by Category

- Retail 118
- Wholesale 239
- Retail and Wholesale 999
- Institutional 73
- Registered 332

Total Nurseries (All categories*) - 1,761

Number of Acres by Category

- Retail 700.4
- Wholesale 6,482.0
- Retail and Wholesale 12,133.4
- Institutional 78.0
- Registered 167.4

Total Acreage (All categories*) -19,561.2

Total Collected Plant Certificates Issued - 68

Total Number of Nursery Dealers** - 2,826

*Categories

A—Retail - Any nursery where 80% or more of the nursery stock sold is to the final consumer for their use.

B—Wholesale - Any nursery where 80% or more of the nursery stock sold is to other nurseries, dealers, or other persons for resale.

C--Retail and Wholesale - Any nursery where sales consist of nursery stock which is sold as follows: (1) Directly to the final consumer, and also (2) To other nurseries and/or dealers for resale with the percentage of total sales for each category being less than 80%.

I—Institutional - Any nursery owned or operated by any governmental agency.

R—Registered - Any nursery less than one acre in size that produces nursery stock, but does not sell, barter, or exchange such articles outside the state.

**Nursery Dealer – Any person not a grower of nursery stock who obtains certified nursery stock and/or collected plants for the purpose of distribution or sale independent of the control of a nursery.

Phytosanitary Certification Program

Imported Plants and the Post-Entry Quarantine (PEQ) Program 2009

The federal Post-Entry Quarantine Program, conducted cooperatively between USDA-APHIS-PPQ and State plant pest regulatory officials, enables individuals or companies to import plant material from outside the U.S. that may pose a plant pest risk. Plants must be kept under quarantine for two growing seasons and be inspected for pests of quarantine significance (primarily diseases) before the importer is allowed to move, use, or sell them without restriction. The program also involves conducting pre-importation, site-screening inspections.

- A shipment of 3442 Maple trees (*Acer* spp.) were released from post entry quarantine in 2009.
- One pre-importation, site screening inspection occurred in 2009.

Export Certification Program 2009

Within the Export Certification Program, Plant Protection Specialists issue Phytosanitary Certificates to growers and/or brokers to facilitate movement of agricultural commodities to other states and countries. Phytosanitary Certificates indicate that inspections and other specific requirements of the importing states and countries have been met. State certificates are used for movement within the U.S., and federal certificates are required for movement to another country. Countries and states vary greatly in what they require for various types of commodities such that careful research and interpretation of requirements are needed for each request for phytosanitary certification. An expanded use of the USDA PCIT (Phytosanitary Certificate Issuance and Tracking System) to issue Federal certificates continued in 2009. An electronic certificate template was developed, and the capacity to issue state phytosanitary certificates within the PCIT system was implemented in January 2009. Certificates were issued for the movement of commodities to 43 countries, 26 states and Puerto Rico. The majority of phytosanitary certificates issued were for lumber, tobacco, cotton, cotton seed, Christmas trees, peanuts, nursery and greenhouse plants, sweetpotatoes, and sweetpotato cuttings.

Summary of Certificates issued in 2009 by Category:

Category	Number Issued
Federal Certificates	
Phytosanitary Certificate	1,377
Re-Issue Certificate	101
Re-Export Certificate	19
Processed Product Certificate	57
Number Issued in PCIT	1121 (75% of total issued)
State Certificates	
Phytosanitary Certificates	296
Number Issued in PCIT	110 (37% of total issued)

Plant Conservation Program (PCP)

N.C. Plant Conservation Board

The Program meets quarterly with members of the North Carolina Plant Conservation Board whose seven members are appointed by the Governor and the Commissioner of Agriculture. Among the issues the Board considers are revisions to regulations as well as land acquisition projects.

N.C. Plant Conservation Scientific Committee

The Program meets frequently and regularly with members of the North Carolina Plant Conservation Scientific Committee. This seven member committee consists, primarily, of positions designated to the committee by law. Members provide scientific guidance to the Program and Board and were instrumental in developing a systematic evaluation process to determine which native plants in North Carolina are facing the most severe threats and serious population declines, as well as proposing a commercial trade policy to the Board.

Plant Conservation Preserve System

The Program manages a Preserve system currently consisting of 18 Preserves in 13 counties comprising just over 11,000 acres. Approximately 354 acres and two new Preserves were added to the N.C. Plant Conservation Preserve system. These additions included:

(1) Tater Hill Preserve – 157.304 acres added
(2) Eastwood Preserve - 127 acres added
(3) Cedar Cliff Preserve (Jackson County) – NEWLY ESTABLISHED, - 73.64 acres
(4) Eno River Diabase Preserve – 32.12 acres added
(5) Mineral Springs Preserve (Union County) – NEWLY ESTABLISHED, 60.39 acres

The first four projects were funded by grants obtained from the Natural Heritage Trust Fund (NHTF) the fifth was a donation from the North Carolina chapter of The Nature Conservancy.

Natural Heritage Trust Fund Grants
Additional grants were obtained to expand the Preserve system in the near future. These grants include expansion of the following Preserves:

1. Ochlawaha Bog - $347,590
2. Boiling Spring Lakes - $360,000
3. Eno River Diabase Sill - $ 85,250

Total: $792,840

Clean Water Management Trust Fund (CWMTF) Grants

For the first time, the Plant Conservation Program submitted an application to CWMTF. The application requested $2,064,737 to purchase an addition to the White Oak Mountain Plant Conservation Preserve (Polk County). Also, the Program worked with two local land trusts (Blue Ridge Rural Land Trust and the Eno River Association) to prepare and submit additional applications submitted by these partners for funding towards expansion of other Preserves.

Site Acquisition Planning

The Plant Conservation Program has the regulatory authority and capability to establish Plant Conservation Preserves to protect endangered and threatened plant species. A systematic and comprehensive evaluation of site protection needs and opportunities was conducted for the first time in Program history. This site acquisition planning process identified 191 sites across North Carolina that are needed to protect imperiled plant species in their natural habitats.

Plant Conservation Preserve-Management Activities

Prescribed Burns conducted by staff:
1st burn ever at Harvest Field Preserve
1st burn ever at the Goldston tract (Eno Diabase Preserve)
1st burn ever of the Williams tract (Eno Diabase Preserve)
1st burn at the Orion tract (Boiling Spring Lakes)
1st ever burn designed for an imperiled species (Pondberry) – including construction of an extensive hand fire line
Five additional prescribed burns at Pondberry Bay Preserve totaling over 945 acres
215 acres burned at East unit (Hog Branch Ponds Preserve)

Planning and fire line construction occurred at several sites for which weather did not cooperate and burns were not completed.

Prescribed Burns conducted in partnership:
Private Contractor burn of Tufts tract (Eastwood Preserve)
The Nature Conservancy Burns of two units at Boiling Spring Lakes Preserve
Staff and U.S. Army Corps of Engineers burned two tracts in Granville County
NCDFR conducted two contract burns at Boiling Spring Lakes Preserve (Long Bay & Orion block)
Staff and North Carolina Botanical Gardens conducted burn at Eno Diabase Preserve and Penny's Bend Preserve

Conservation Management Activities:

Extensive chainsaw thinning at Denson's Creek Preserve
Three Volunteer days at Eno Diabase Preserve (trash pick-up, hand clearing, and invasive plant removal)
Herbicide treatments to control invasive species at Eno Diabase Preserve
Tree planting on ~ 125 acres in partnership with The Nature Conservancy at Hog Branch Ponds Preserve
Monitoring and detailed population counts of rare plants at numerous Preserves across the state
Hand clearing/chainsaw removal of heavy brush at Hebron Road Preserve
Bushhogging to reduce invasive species at Eno Diabase Preserve
Extensive chainsaw thinning at Pondberry Bay Preserve
Approximately 20 acres of heavy brush reduction (with forestry cutter) at Boiling Spring Lakes Preserve
Venus Flytrap marking, seed collection and planting at Boiling Spring Lakes Preserve
Watershed restoration planning and evaluation developed in partnership with Carolina Land Conservancy and USFWS for Ochlawaha Bog Preserve
Handclearing and chainsaw thinning at cooperative management site (Blue Indigo Slope Preserve)
Employed and supervised prison crews to construct fire lines at three Preserves
Posted boundary signs at two Preserves

U.S. Fish & Wildlife Service (USFWS)

The NCDA&CS' Plant Conservation Program and USFWS continued a long-standing cooperative agreement related to the recovery of endangered and threatened species in North Carolina. Grant funds obtained under this cooperative agreement fund two PCP staff.

Partnership Projects

The Plant Conservation Program is a member of several statewide or regional conservation partnerships and staff participates in these partnerships as time allows. In addition, staff regularly reaches out to the public with special presentations and by filling information requests.

Plant Conservation Program-Regulatory Programs

There are currently 164 plant species or varieties on the North Carolina protected plant list; 27 of these species are also federally protected. Program staff meets quarterly with an interagency panel to review permit requests for projects affecting protected plant species. A total of 64 permits were issued, of which 44 were protected plant permits and 20 were for Preserve access.

American Ginseng

American Ginseng is treated as a "special concern" species due to federal listing of the plant under federal and international laws (CITES). Without monitoring by the Plant Conservation Program, harvest and export from North Carolina will not be permitted by federal authorities.

During the 2007 harvest season, program staff issued 51 Ginseng Dealer permits. The total amount of wild ginseng harvested and sold totaled 12,863 pounds. This amount was a record harvest for North Carolina, nearly double the amount (increase of over 6,100 pounds) recorded for the previous harvest season, making North Carolina the leading harvest state in the U.S.

For the 2008 harvest season, the program staff again issued 51 dealer permits. The total amount of wild ginseng harvested and sold totaled 11,402 pounds.

Plant Pathology Program

EXPORT: Disease certification requirements and distribution information

The Plant Pathologist received and handled requests from Field Specialists (as well as USDA-APHIS-PPQ personnel) for assistance with interpreting plant disease certification requirements, developing specific certification procedures, and providing disease organism distribution information. As a member of the Trade Support Group – which consists of individuals from USDA-APHIS-PPQ, NCDA&CS' Marketing Division, and NCDA&CS' Plant Industry Division -- she provided input in regard to emerging trade issues as they related to plant pathogens. She completed four preliminary feasibility evaluations to outline what would be required from a plant-pest certification aspect if specified foreign markets were developed.

EXPORT: Tobacco blue mold oospore survey (for certification of tobacco to China)

A blue mold oospore field survey must be completed annually in states where blue mold was reported in order to certify tobacco for export to China. More information, as well as the sampling procedure itself, is outlined in the USDA-APHIS Export Certification Manual at http://www.aphis.usda.gov/import_export/plants/manuals/domestic/downloads/xpm_pdf/4_8specproc_com_tobacco.pdf. The Plant Pathologist has been the state survey coordinator every year since the program began in 2001. State survey procedures are updated and sent to the NCSU Tobacco Pathology Specialist for distribution to N.C. Cooperative Extension Service personnel (county agents). The county agents participate by collecting samples from affected counties and submitting them to the approved lab. The 2008 survey was initiated in July 2008. Except for one blue mold detection in a burley tobacco research field plot very late in the 2008 growing season – too late for the required waiting period to pass between detection and sampling before harvest – blue mold was not detected in North Carolina in 2008, and therefore no samples were collected. Preliminary plans were made to host a team of visiting Chinese buyers and scientists in August 2008, but the visit never materialized. This may happen in August 2009. The survey for 2009 was initiated in June 2009; results are not yet available.

EXPORT: Nematode certification

Before plants and certain other plant products can be certified for export to Canada from North Carolina, they must be certified free of soybean cyst nematode (SCN). California has a similar requirement for reniform and burrowing nematodes. To assist nurseries that request certification, Field Specialists collect soil samples and submit them to the

NCDA&CS' Agronomic Division's Nematode Assay Section lab (NAS) according to procedures developed by the Plant Pathologist. A sampling table based on numbers of plants or area sampled is used so that costs for assays can be predetermined prior to collection and submission. During this reporting period, fifteen (15) North Carolina nurseries were soil-surveyed for nematode certification. This involved the collection and submission of 126 field samples (252 lab assays). Reniform and burrowing nematodes were not found in any of the samples. [These nematodes have never been found in a nursery in North Carolina. Reniform nematode has been found in North Carolina under agronomic field conditions in eight counties, but burrowing nematode has never been found at any location.]

Cyst-type nematodes were found in samples from three of the 15 nurseries. With the use of PCR testing methods developed cooperatively by the Plant Industry Plant Pathology Lab (PPL) and the NAS, the cysts were identified as something other than SCN (i.e., *Heterodera trifolii* and *Cactodera weisii*, both of which are common on weeds in North Carolina). Under a cooperative project with the NAS, the NAS is also using PCR to test cysts found in general service samples from counties where SCN has not been previously confirmed in order to expand the known-distribution map for SCN (Montgomery County was added during this reporting period). The Plant Pathologist updated North Carolina's data for a national SCN distribution map with the help of NCSU and NAS personnel. As a result, four counties were removed from the North Carolina distribution map (based on unconfirmed data) and two counties were added (based on documented detections).

IMPORT: Movement of plant pathogens for research and other purposes

The Federal PPQ Form 526 ("Application and Permit to Move Live Plant Pests or Noxious Weeds") permits the movement of plant pathogens and other pests into North Carolina from other states or countries for research, diagnostic identifications, or commercial uses. USDA-APHIS-PPQ receives the applications initially, evaluates them, adds conditions, and forwards the draft permits to the Plant Pathologist via the e-Permit system for final evaluation and approval. Because all plant pathogenic organisms are subject to this requirement, the pest-risk of each organism must be individually-evaluated to ensure that adequate safeguards are listed in the conditions of the permits. Twenty-nine (29) permit applications were evaluated by the Plant Pathologist, with most requiring further clarification or documentation from PPQ before State approval could be given. Three (3) permits were for receiving non-specified or unknown organisms (one each for bacteria, viruses, and plant pathogens in general); these require stricter safeguards to prevent plant pest escape into the environment. Individually-requested organisms included 170 fungi, 146 bacteria, six viruses, and one nematode.

NURSERY: Federal Black Stem Rust Quarantine (certification of ornamental barberry)

Black stem rust (BSR) is a serious fungus disease of wheat and other grain crops. It also infects plants in the genera *Berberis, Mahoberberis*, and *Mahonia*, which are commonly known as "barberry plants". Most wild barberry plants are susceptible to BSR, but ornamental types can be resistant or susceptible. Susceptible plants pose a risk of spreading BSR and contributing to the development of new races of BSR that can overcome the disease resistance bred into wheat varieties. Resistant barberry plants do not pose this risk to wheat. Major wheat-producing states are "protected" under the federal BSR quarantine. In "protected" states, the wild, susceptible barberry plants have been eliminated from the

environment and nurseries, and only resistant barberry plants are grown in nurseries. Under the BSR quarantine, susceptible barberry plants cannot be shipped into protected states. Due to renewed concerns that susceptible ornamental barberry plants are being shipped into protected states, USDA-APHIS-PPQ asked states for increased vigilance and compliance with the quarantine. Updated field operational procedures were developed by the Plant Pathologist for use by Plant Protection field personnel. An information note for nurseries that explains the quarantine requirements was also developed. Both were posted on the Plant Protection field operations website for future reference. At the current time, two (2) nurseries are under a BSR compliance agreement to ship barberry into protected states.

NURSERY: Submission and diagnosis of problem-plant samples

The Division does not maintain a lab for general diagnostic purposes. Plant Protection Specialists collect problem-plant samples from nurseries during nursery inspections and submit them to the NCSU Plant Disease and Insect Clinic (Raleigh) for diagnosis and control recommendations. These samples are assayed *gratis* if the submission sheets are entered on-line. This on-line procedure was initiated in 2008 and required all Specialists and staff to obtain a Clinic account and learn the new procedure. The Plant Pathologist serves as the liaison between the Specialists and the Clinic, assisting with interpretation of diagnoses and recommendations when necessary. Thirty-three (33) problem-plant samples were submitted during this reporting period.

NURSERY: Strawberry plant nursery inspections

Strawberry plants are defined as nursery stock under the nursery certification regulation. Due to the threat of anthracnose disease, special inspection procedures are followed by field personnel (i.e., multiple inspections, timing and intensity of inspections, and required removal of symptomatic plants. Although plants with anthracnose symptoms must be removed from the field prior to harvest so that harvested plants are "apparently free" of the disease, it is generally accepted that non-symptomatic plants can still be infected. This is emphasized to berry growers (the end-users of the plants) in newsletters and other outreach efforts so they can take precautionary measures involving fungicide applications at planting time and later in the season. Starting with the 2008 growing season, the N. C. Crop Improvement Association (NCCIA), which previously administered a higher-level strawberry plant certification program with a zero-tolerance for anthracnose, terminated its "certified" plant program while retaining its "registered" and "foundation" programs. As a result, the NCDA&CS was responsible for inspecting all previously-NCCIA-certified strawberry plant nurseries. Previously, NCCIA was responsible for inspecting all NCCIA plants under a Memorandum of Understanding with NCDA&CS. In 2008, five strawberry plant nurseries consisting of 147 acres total at 11 locations were inspected and certified by NCDA&CS. Anthracnose was detected in eastern nurseries but not in nurseries located in the western part of the state.

SUDDEN OAK DEATH – Nursery and Nursery Dealer Survey

Sudden Oak Death disease caused *Phytophthora ramorum* is killing thousands of oak trees in California and Oregon. To prevent artificial movement out the known-infested areas, shipments of nursery host plants are regulated by federal (USDA-APHIS-PPQ) and state quarantines. The host list is broad and continues to expand. However, the highest-risk types of plants appear to be species of Camellia, Kalmia, Pieris, Rhododendron, and Viburnum. General background and actions taken in North Carolina can be found on the Plant

Protection Section website (http://www.ncagr.com/plantindustry/plant/disease/sod.htm). A survey of selected nurseries and nursery dealers was again conducted in April-June 2009 (6th year). This is funded under the CAPS Program. A total of 40 locations were inspected according to the federal nursery survey protocol. Field Specialists collected and submitted 81 samples from plants with suspicious symptoms. These were pre-screened by ELISA testing for *Phytophthora* species. DNA was extracted from 29 ELISA-positive samples (by either the NCSU Plant Disease and Insect Clinic or the PA PPQ lab) and sent to an approved PPQ lab for PCR confirmation. No evidence of *Phytophthora ramorum* was found in any of the samples except at two locations. One location was positive in 2008; the other was a new detection. These are further discussed in the "SUDDEN OAK DEATH -- REGULATORY ISSUE: Detections at Nursery Dealers" section below.

SUDDEN OAK DEATH – Program Review

In June 2009, NCDA&CS' personnel participated in a three-day Sudden Oak Death program review conducted by a team of USDA-APHIS-PPQ personnel from different parts of the country. (Connecticut was the other eastern area state that agreed to participate). To prepare for this, the Plant Pathologist assembled support materials to document activities for all aspects of the program as it related to survey, laboratory, and regulatory issues. A notebook of these items as well as the N.C. Survey Manual and other North Carolina-specific protocols were supplied to the review team. She and other NCDA&CS' personnel participated in the discussions and answered questions, demonstrated survey methods in the field at three nursery/nursery dealer locations, demonstrated NCDA&CS' laboratory procedures, and facilitated a visit to the NCSU Plant Disease and Insect Clinic (which provides DNA extractions of ELISA-positive samples for NCDA&CS). A report of the review team should be forthcoming.

SUDDEN OAK DEATH -- REGULATORY ISSUE: Detections at two nursery dealers

On June 6, 2008, *Phytophthora ramorum* (Pram) was confirmed on rhododendron samples collected by a Plant Protection Specialist during a CAPS nursery dealer survey in Mecklenburg County. This was the first detection of Pram in North Carolina during a general survey rather than through a targeted, trace-forward investigation. NCDA&CS and PPQ personnel cooperatively addressed this detection, immediately initiating the federal confirmed retail nursery protocol. As a result of the delimiting survey, Pram was also found on mountain laurel (*Kalmia*). Consequently, around 1000 plants (Rhododendron, Pieris, and Mountain Laurel) were destroyed either as required by the protocol or voluntarily by the owner. Water and soil samples were also collected and assayed with the help of U.S. Forest Service, N.C. Forest Service, and Clemson University personnel. One soil sample (from the rhododendron area) was positive; the owner had already opted to pave over the areas (i.e., an approved treatment) and did so. Plant samples collected during the 90-day re-survey of the nursery in September 2008 were negative. In June 2009, the location was resurveyed. Pram was found on one Pieris plant and one Kalmia plant in different areas of the nursery. Two plant destruction/quarantine zones were established around these two areas, and media and soil samples were again collected. Pram was recovered from the Pieris media sample but not from any of the other media/soil samples. The target plants were either destroyed or placed under a 90-day quarantine, depending on their proximity to the originally-infected plants. Inspections and other mitigating procedures are continuing. As a consequence of being confirmed positive twice within the same year, the nursery dealer will be placed under more strict requirements in order to eradicate Pram from the premises.

In late June 2009, Pram was confirmed on rhododendron samples collected by a Plant Protection Specialist during a CAPS nursery dealer survey in Transylvania County. NCDA&CS and PPQ personnel cooperatively addressed this detection, immediately initiating the federal confirmed retail nursery protocol. Regulatory activities will continue into the next fiscal year. (In July, the delimiting survey did not detect Pram in any other plants. Media and soil samples were collected and sent to the PA PPQ lab for assay. Plants from within the destruction circle (required by protocol) and the quarantine zone (as per owner request, in lieu of holding plants for 90 days) were destroyed).

SUDDEN OAK DEATH -- REGULATORY ISSUE: Trace-forward notifications

In spring 2009, NCDA&CS received two trace-forward notifications for *Phytophthora ramorum* (Pram) from PPQ. One involved shipments of rhododendron from Washington to two homeowners (six plants total). The other involved shipments of rhododendron, camellias and other hosts from Oregon to 17 homeowners (~70 plants total). Because none of the recipients were nurseries, the investigation was handled cooperatively with PPQ, with PPQ taking the responsibility for locating the sites and generating the required inspection reports. NCDA&CS' Field Specialists accompanied PPQ personnel on nearly all the visits to assist with the inspections. Samples of symptomatic plants were submitted to the PA PPQ lab; all were negative for Pram.

SUDDEN OAK DEATH – REGULATORY ISSUE: Trace-back notification

NCDA&CS received a trace-back notification in March 2009 for *Phytophthora ramorum* (Pram). This was the result of a Pram detection at a New Jersey retail nursery that had received plants from a large North Carolina production nursery as well as from several other nurseries from other states. (Under these circumstances, the initial infection could have occurred on plants that are no longer present and could have spread to other plants at the location from these). New Jersey inspectors had initially implicated a particular rhododendron variety. The trace-back inspection of the target rhododendron plants was completed by NCDA&CS and PPQ personnel. Samples were collected and tested by the NCDA&CS' lab; Pram was not detected. A cull-pile soil/media samples were also taken and sent to the Clemson lab for assay; it was negative for Pram. A short time after the initial visit, New Jersey inspectors confirmed Pram on a Pieris at the same location, and another trace-back inspection was requested. NCDA&CS and PPQ personnel returned to the North Carolina nursery and inspected the target Pieris plants; Pram was not detected. NCDA&CS' personnel returned to the nursery in May 2009 to conduct a CAPS nursery survey. Pram was not detected.

Tobacco Plant Inspections

The N.C. Tobacco Plant Certification Regulation requires that anyone who moves tobacco plants into North Carolina from another state must do so under an import permit system. There were no import permit applications received in 2009. Another aspect of the regulation requires that plants grown in North Carolina and sold for planting in a location more than 75 miles away from the place of production must be inspected and certified. A major reason for this requirement is to prevent the artificial movement of blue-mold or virus-infected plants from one growing region into another, which could initiate a premature disease epidemic. During the 2009 shipping season, there was only one certified tobacco plant grower (~2.4 million plants in 3 greenhouses). No pest or disease problems were

detected during the inspections.

Vegetable Plant Inspections

The Vegetable Plant Certification regulation requires weekly inspections and certification of vegetable plants grown in North Carolina for sale to commercial growers. There were no vegetable plant nurseries certified by the NCDA&CS during this reporting period. The N.C. Crop Improvement Association (NCCIA) certifies a large number of sweetpotato cuttings and seed under its certification program. Because NCCIA certification requirements meet or exceed those of the regulation, NCDA&CS accepts NCCIA's inspections and certification tags in lieu of its own.

The regulation also requires that any plants or seed potatoes entering North Carolina from another state be inspected and certified to meet certain disease standards. A severe late blight of potato epidemic in the northeastern U.S. in 2009 was partially attributed to the distribution of late blight-infected tomato plants from out-of-state sold at big-box stores to homeowners who then planted them in the vicinity of potato production areas. However, this apparently did not happen in North Carolina although late blight was detected on potatoes in several North Carolina counties. At least seven NCDA&CS' Field Specialists reported conducting inspections of vegetable plants at big-box locations. None reported detections of late-blight infected tomato plants or other problems (note: subtle symptoms might have gone unnoticed or attributed to common plant neglect). NCDA&CS started an investigation to document the sources of Bonnie Plant Farm (BPF) plants offered for sale in North Carolina. The home office of BPF, which is a large producer of vegetable plants that sells through big-box stores to homeowners nationally, is located in Alabama. BPF plant labels often have the Alabama address on them, implying they are produced and inspected in Alabama. However, it was determined that nearly all of the BPF plants sold in North Carolina are produced in North Carolina at two greenhouse production facilities and are rarely shipped into other states. According to the Vegetable Plant Law, vegetable plants grown in North Carolina for sale to homeowners are not required to be inspected. However, due to late blight and other diseases that might be spread on homeowner plants to commercial production areas and the fact that BPF sells plants to nursery dealers for re-sale, these two production facilities will be inspected and certified next season.

Regulatory Weed Program

Program Objective

The objective of the Regulatory Weed Program is to protect North Carolina agriculture, public health and native plant ecosystems from the harmful effects of noxious weeds. The regulation of noxious weeds is authorized by the North Carolina Plant Pest Law and the Aquatic Weed Control Act of 1991. Program activities include inspections, issuance of Phytosanitary Certificates, issuance of Scientific Permits for movement of regulated articles and the survey, control and eradication of listed noxious weeds. The program manager is also accountable for management of the Witchweed Eradication Project funded by USDA-APHIS.

Program Accomplishment Highlights

Witchweed Eradication

- The Witchweed Program continues to make some gains in released acres in spite of the discovery of new or re-infested fields. The total acreage of active fields (i.e. fields with fewer than five points) is now 2,308 acres.

- 3,590 acres were treated as part of the Witchweed Eradication Program

- A total of 75,979 acres were surveyed to evaluate status of Witchweed infestation in Southeastern counties of North Carolina

- GPS waypoints have been collected for all active Witchweed fields (fields with fewer than five points)

Tropical Spiderwort

- The only significant infestation of tropical spiderwort (*Commelina benghalensis*) continues to be contained within the CEFS area of the Cherry Research Farm. A two acre area outside of CEFS was fumigated and a 55 acre field proposed as a building site for a DHHS hospital was fumigated to reduce risk of soil movement during construction.

- Two small patches in landscape beds at the Caswell Research Farm office building were also fumigated by hand.

Other Noxious Weeds

- The NCDA&CS assisted the North Carolina Beach Vitex Task Force in survey for beach vitex sites in Carteret, Dare and New Hanover Counties. Several new sites were discovered.

- High risk sites for establishment of tropical soda apple were identified and surveyed throughout North Carolina. Approximately 60 tropical soda apple plants were found at Martin Meats in Sampson county. All plants were bagged and incinerated.

- Small broomrape (*Orobanche minor*) continues to be confined to only a few plants in several locations of Mitchell County. Annual surveys are necessary to find the plants and destroy them to prevent additional spread.

- Purple loosestrife (*Lythrum salicaria*) continues to be confined to only a few plants in several locations throughout the state. Annual surveys are necessary to find the plants and treat them with herbicide to prevent spread.

- New itchgrass (*Rottboellia cochinchinensis*) sites were discovered in Robeson county. All affected farmers were contacted and some areas were treated with herbicide.

- Advice was provided on the control and containment of Florida betony reported by the DOT, N.C. Parks, the U.S. Fish and Wildlife Service and several homeowners.

Regulatory

- The proposed change in the Noxious Weed Regulations to add Beach vitex (*Vitex rotundifolia*) and bushkiller (*Cayratia japonica*) to the Class B list of noxious weeds was approved by the North Carolina Board of Agriculture.

- Noxious weed regulatory policy has changed to prohibit sale and distribution of ALL varieties of Cogongrass (*Imperata cylindrica*) including red baron varieties.

Public Relations and Outreach

- The NCDA&CS' Weed Specialist was elected to the board of the North Carolina Vegetation Management Association. The Weed Specialist is also active as a board member on the Aquatic Weed Control Council and North Carolina Exotic Pest Plant Council.

- A description of the Regulatory Weed Program and current projects were presented to participants in an NCSU invasive plants short course and to a local chapter of the Society of American Foresters.

- An update of the Carolinas Witchweed Eradication Program was presented in the Regulatory Section of the 2008 Weed Science Society Annual meeting.

Weed Survey and Eradication Program Details

Survey Methodology and Rationale

Surveys for all projects were done by visual reconnaissance. Survey objectives include: 1) identification of new weed pest infestations (i.e. detection surveys); and, 2) boundary delimitation for weeds mapped in previous years (i.e. delimiting surveys). Detection survey location targets were selected based on probability that subject plant pest would be present. In some instances GPS coordinates were recorded to provide reference points for mapping and relocation, if needed. Roadsides close to wet areas and home landscapes were targets for Purple loosestrife detection surveys. Locations known to have been infested with *Orobanche minor* in the past were checked at least three times in spring or early summer for reoccurrence of the weed. A known infestation in a hay field was monitored to delimit the size of *Orobanche minor* infestation and prevent additional spread by hand pulling plants at time of survey. The infestations of tropical spiderwort at the Cherry Research Farm (2,245 acres) and Tidewater Research Station (1,516 acres) were delimited by continuous surveys across all land in both places every three to four weeks through the growing season.

Since plant species must be identified during the growing season, all surveys were done during the period from full leaf (May) through the first hard freeze (usually mid November). No taxonomic services were budgeted or used in the projects.

Broomrape *(Orobanche minor)*

The only Orobanche infestations are in Mitchell County. An infested hay field near Ledger, North Carolina was treated with Redeem R&P herbicide on April 24, 2008 to remove the clover and vetch host plants. The treatment was successful in the internal parts of the field, but some broomrape plants were discovered on the edge of the field where host plants were

still available. These plants were removed by hand pulling. One plant was also found and pulled by hand from a site near the hay field where it is believed the Orobanche infestation was first reported.

Ten roadside locations with known past infestation were surveyed by the end of June. Five of these locations had at least one plant. Three plants were found at two of these locations, two plants at one location, five plants at one location and 16 plants at another. In addition, three plants were found at a new roadside location apparently in a spot along the road where roadside mowing machines were washed in the past. All plants were rogued and placed in plastic Ziploc bags for incineration.

Purple Loosestrife (*Lythrum salicaria*)

Past infestation sites in Forsyth and Davidson Counties which are located along a sewer and utility line rights-of-way spanning approximately six miles within the watershed of Fiddler and South Fork Creeks were surveyed and spot treated May 28, May 29, August 5, August 6 and October 7. A total of approximately 17 acres were spot-treated during these dates with a 2% mixture (Volume/Volume) of Garlon 3A.

One site near the New River in Pender County is surveyed each year. Approximately forty plants at the site were sprayed in spring of 2008 with follow-up survey and treatment of about 20 plants in August. No plants were seen in a follow-up September survey.

Known past infestations were also surveyed in Alleghany, Ashe, Avery, Mitchell, Onslow, Yancey and Watauga Counties. Five plants were detected and treated at a site in Alleghany County. Three new homeowner sites with a total of 13 plants were discovered in Ashe County and one new site with one plant was discovered along a road shoulder near Banner Elk in Avery County. A 0.5 acre site along highway 258 in Onslow County near the New River was surveyed on May 15, August 11 and in September. Approximately 35 plants at the Onslow County site were treated on May 13 and 20 plants were treated on August 11. In Yancey County one plant was discovered at a household. Sixteen previously infested sites were surveyed in Watauga County. One of the sixteen sites near a business had three plants and the site near Bass Lake on the Blue Ridge Parkway had 36 plants. All purple loosestrife plants were treated with herbicide or destroyed by homeowners.

Tropical Soda Apple (*Solanum viarum*)

Cattle operations that had received cattle from Florida since 2005 were identified for survey of Tropical Soda Apple in 2008. Thirty four potential operations were identified and survey of currently active operations was done before the end of the growing season with negative results.

Fairgrounds in Alleghany County and stockyards in Ashe, Iredell and Watauga Counties were surveyed for Tropical Soda Apple. No plants were discovered.

Survey is completed each year at Martin Meats and Coharie Farms in Sampson County. Survey on 550 acres was completed on July 30 and September 23 at Martin Meats and survey on 850 acres was completed July 30 at Coharie Farms. Tropical soda apple plants were only found at Martin Meats (24 plants on July 30 and 36 plants on September 23). All plants were bagged and incinerated.

Itchgrass (*Rottboellia cochinchinensis*)

Survey for itchgrass was done at locations of known past infestations in Robeson County. Approximately, 2400 acres were surveyed. Itchgrass was again discovered in a field with known infestation near highway 501 in Robeson County. Also, a new infestation was discovered in another field near an interchange for a new road. Figure 1 shows the locations in Robeson County.

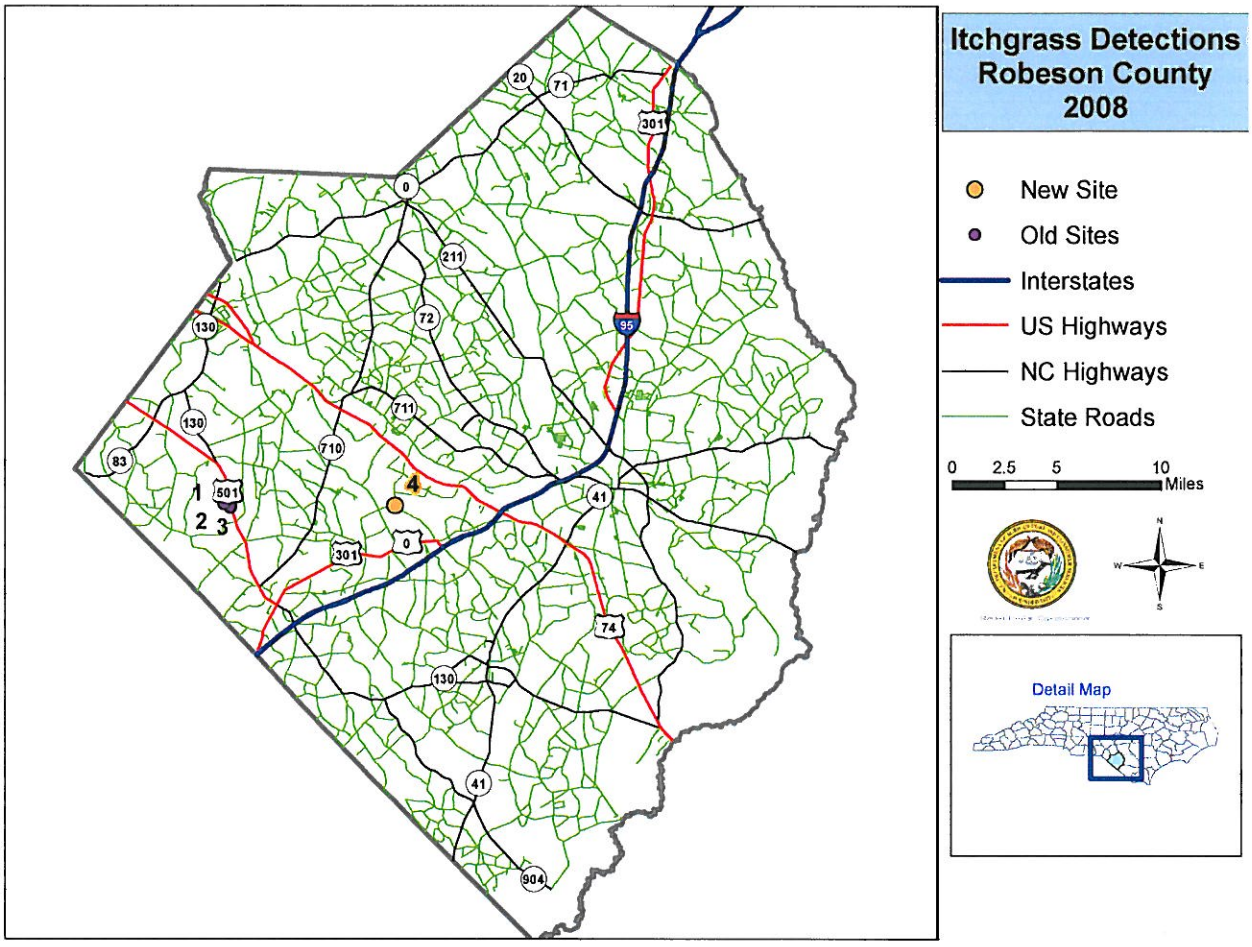


Figure 1. Itchgrass Detections in Robeson County, NC as of 6/30/08.

Pre-emergent herbicides were applied to field margins or at the interface of fields and roads, in cooperation with the NCDOT in early February, 2009 to prevent itchgrass germination.

Cogongrass (*Imperata cylindrica*)

Roadsides in the following counties were scouted for cogongrass at the same time as survey was underway for other weeds of concern: Alleghany, Ashe, Avery, Burke, Caldwell, Davie, Iredell, McDowell, Mitchell, Watauga, Wilkes, Yancey, Alexander, and New Hanover. No cogongrass was found. All varieties of cogongrass, including Red Baron or Japanese Bloodgrass, are now prohibited for sale or distribution in North Carolina effective November 1, 2008. Prior to implementing the new policy, nurseries were informed of the intended change by letter. Since promulgation of the new policy, a stop sale and/or plant destruction of cogongrass

has impacted only three nurseries where 20 or fewer plants were found.

Canada thistle (*Cirsium arvense*), Musk thistle (*Carduus nutans*) and Plumeless thistle (*Carduus acanthoides*)

Canada thistle is currently regulated in the following counties: Ashe, Avery, Haywood, Mitchell, Northampton and Yancey. Canada thistle was also found during 2008 in Alleghany and Watauga Counties. Musk thistle is regulated in the following counties: Buncombe, Cleveland, Chatham, Gaston, Henderson, Lincoln, Madison, Randolph, Rowan and Rutherford. In 2008 musk thistle was also found in Ashe and Mitchell Counties. Plumeless thistle is regulated in Haywood, Jackson, Madison and Watauga Counties. In 2008 plumeless thistle was also found in Alleghany and Ashe Counties

Florida betony (*Stachys floridana*)

Florida betony is a regulated noxious weed in the following counties: Bladen, Brunswick, Cumberland, Forsyth, Hoke, New Hanover, Onslow and Wake. In May, 2008 it was reported and verified at two sites in Washington County, at one homeowner site in Durham County and at one site in Carteret County. In all instances control options and the measures for preventing spread were discussed with the landowner managers.

Witchweed (Striga asiatica) Eradication Program

Witchweed Eradication Program Objectives, Methods and Rationale:

Witchweed (*Striga asiatica*) is a Federal Noxious Weed and a Class 'A' State Noxious Weed in North Caraolina. It is an obligate parasite which attacks corn, sorghum, millet, and other warm season crops in the grass family. Heavy infestations of Witchweed can eliminate yield from these crops, resulting in devastating economic losses. The presence of this quarantined pest also imposes a regulatory burden on crop production and on the movement of farm commodities, equipment, and other regulated articles. The Witchweed Eradication Program includes an organized and effective set of survey, control and regulatory procedures developed through early USDA-APHIS research. Specific objectives of the program include: 1) characterization of the infestation through survey; 2) control of existing infestations; and, 3) containment by preventing the movement of potentially infested articles out of established quarantine boundaries.

1. **Survey** – Survey is necessary to detect and verify the extent of Witchweed (Detection and Delimiting surveys), evaluate the effectiveness of eradication treatments on infested properties (Appraisal surveys), and verify eradication of Witchweed on sites released from quarantine (Released surveys). Additional survey of terminated acreage is required in order to confirm the long-term effectiveness of the eradication program. Survey is done through the growing season after host plants have started to grow from about the middle of June through the end of October or until the first frost.

2. **Control** – The objective of control treatments is to prevent Witchweed seed production and eliminate Witchweed seed from the soil. Herbicide treatments, hand

pulling and disking help to control Witchweed host plants and Witchweed plants before they can flower and produce seed. Methyl bromide fumigation of additional infested acreage will destroy reserves of Witchweed seed in the soil and accelerate completion of the eradication program. Ethylene applications also help to deplete soil reserves of Witchweed seed by encouraging germination and subsequent control by exposure to treatments or a non-host crop. Control treatments can be completed during the growing season and into the winter months provided soil moisture and temperature are favorable for soil fumigation.

3. **Regulatory** – Regulatory activities aid in preventing the artificial spread of Witchweed from infested areas to non-infested sites. These regulatory functions facilitate the interstate and intrastate movement of agricultural commodities from Witchweed regulated areas.

Witchweed Eradication Program Acreage Status by State

All control treatments and surveys are tracked in an ACCESS database that updates the status of infested fields and released fields. New or re-infested fields are added to the infested field list when Witchweed is confirmed in new fields or fields that have been previously released. A point system was developed for the program that provides a quantitative measure for moving fields from infested to a released status and from a released status to a terminated status. Infested fields are assigned points depending on the nature of the field and the control activities that were done on it during the season. Once a field accrues five points it is advanced to "Release" status which means it is surveyed on a schedule for a minimum of 10 years and assigned either 0.5 points for a spot survey or 1.0 points for a general survey. Once a field acquires 10 points it is terminated from the program.

The following summary tables show the estimated status of acreage in North Carolina and South Carolina as of December 31, 2008.

2008 North Carolina Acreage Status

Total Acres Infested	2,308.0
Total Acres Released	237.6
New or Re-infested Acres	234.0
Net Gain in Eradicated Acres	3.6
Total Acres Treated	3,590.8
Acres Surveyed	75,979.1

Infested Acres in North Carolina Quarantined Counties by Point Value

County	0-0.9	1-1.9	2-2.9	3-3.9	4-4.9	Total
Bladen	0	255.50	122.90	206.50	111.70	696.60
Cumberland	289.90	23.50	57.60	46.90	641.7	1059.60
Pender	0	6.50	4.60	0	0	11.10
Robeson	0	0	0	342.0	149.0	491.00
Sampson	25.74	9.30	9.50	1.50	3.70	49.74
Total	315.64	294.8	194.60	596.90	906.10	2308.04

Other Statistics for North Carolina

Acres treated by Contract	20
Counties now infested in NC	5
Number of Witchweed Bounty payments	35
Associated Witchweed Bounty acreage	317
Number of Phytosanitary Certificates Issued	97

2008 South Carolina Acreage Status

Total Acres Infested	66.0
Total Acres Released	88.3
New or Re-infested Acres	0
Net Gain in Eradicated Acres	88.3
Total Acres Treated	293.4
Acres Surveyed	7118.5

Infested Acres in South Carolina Quarantined Counties by Point Value

County	0-0.9	1-1.9	2-2.9	3-3.9	4-4.9	Total
Horry	0	0	0	2.4	39.7	42.1
Marion	0	0	0	0	23.9	23.9
Total	0	0	0	2.4	63.6	66.0

Other Statistics for South Carolina

Acres treated by Contract	0
Counties now infested with Witchweed	2
Number of new Witchweed finds	14

2008 Summary of Survey Acreage

State	Survey Category	Total Acres
North Carolina	Appraisal	14,045.90
	Release	27,919.90
	Delimiting	7,937.40
	Detection	26,075.90
Total Survey Acreage for NC		75,979.10
South Carolina	Appraisal	942.80
	Release	1,551.40
	Delimiting	4,489.30
	Detection	135.00
Total Survey Acreage for SC		7,118.50
Grand Total Survey Acres		83,097.60

Number of Farms and Fields with Fewer Than Five Points (infested) by County

North Carolina

County	Number of Farms	Number of Fields	Infested Acreage
Bladen	39	54	696.6
Cumberland	65	79	1059.6
Pender	1	3	11.10
Robeson	34	45	491.0
Sampson	8	10	49.74
Total	147	191	2307.44

South Carolina

County	Number of Farms	Number of Fields	Infested Acreage
Horry	6	6	42.1
Marion	3	3	23.9
Total	9	9	66.0

Treatment Summary by Crop and Treatment Type
Treatment Acreage by State and Crop.

tate	Crop Name	Number of Acres Treated	Number of Fields
North Carolina	Corn	1004.76	55
	Garden	61.15	18
	Idle (non-crop)	1260.27	101
	Other	145.34	21
	Peanuts	1.00	1
	Soybeans	999.93	48
	Wildlife Planting	94.36	22
	Yard	6.56	9
	Pasture	4.00	1
	Cotton	13.40	3
Total		**3590.78**	**279**
South Carolina	Corn	7.8	1
	Garden	14.70	1
	Idle (noncrop)	125.80	15
	Other	7.0	5
	Pasture	15.0	1
	Soybeans	115.90	5
	Wildlife Planting	7.20	1
Total		**293.40**	**28**
Grand Total for NC and SC		**3884.18**	**307**

Treatment Acreage by Treatment Type (Rates expressed in pounds active ingredient/acre)

Treatment Description	Treated Acres	Number of Fields
North Carolina		
2, 4-D 0.75 PD, O	2.0	1
2, 4-D 1.0 PD, OT	25.60	3
2, 4-D 1.0 + LIQUID NITROGEN	9.40	3
GRAMOXONE 0.25 PD, OT	48.60	4
GRAMOXONE 0.50 PD, OT	97.20	10
GOAL + GRAMOXONE 0.75 + 0.125 PD, OT	1.60	1
2, 4-DB 0.25 OT	1.70	1
ATRAZINE 1.0-1.5 PPI, PES	16.0	3
BASAMID "G" 295 SA	7.01	36
COMMAND 0.75-1.5 PPI	75.50	4
CURBIT 1.1-1.7 PES	9.40	2
DEVRINOL 1.0-4 PES, OT, PD	4.0	1
DISKING-100% GRASS KILL	958.53	79
DUAL 1.125-3.0 PES	61.40	9
ETHYLENE (HAND) 1.5 INJ	1.74	3
ETHYLENE (TRACTOR) 1.5 INJ	680.73	67
EVIK 2.0 PD	123.60	8
METHYL BROMIDE (CONTRACT) 436.0	6.10	4
METHYL BROMIDE (SPOT) 436.0	0.42	5
POAST 0.2-.05 OT, PD	4.0	1
REFLEX 0.375 PD, OT	111.80	7
ROGUE- 100% WITHWEED	150.01	76

REMOVAL		
ROUNDUP 0.50-2.0 OT	911.81	68
TREFLAN "G' 3.0-4.0 SA	19.08	1
TREFLAN-EC 0.5-1.0 PPI	258.31	28
CLARITY 0.25-0.5 OT, PD	5.02	2
ROUNDUP =2,4-D.5-2.0+1.0 OT, PD	0.21	4
TOTAL	3590.77	431.0

Treatment Description	Treated Acres	Number of Fields
South Carolina		
BASAMID "G" 295 SA	3.10	11
DEVRINOL 1.0-4 PES, OT, PD	2.50	1
DISKING-100% GRASS KILL	83.80	7
ETHYLENE (TRACTOR) 1.5 INJ	104.20	11
ROUNDUP 0.50-2.0 OT	92.20	9
TREFLAN-EC 0.5-1.0 PPI	7.60	2
TOTAL	**293.40**	**41**

Witchweed Eradication Project Field Offices

To facilitate Witchweed project field activities, the following staff resources are currently in place to assist with the Witchweed project in North Carolina:

Rick Iverson, Weed Specialist, State funding
Sheyrl Colclough, Processing Assistant III, Federally funded (50% WW, 50% GM)
Fayetteville Work Unit: Robert Cooper, Plant Pest Inspector, Federally funded
Lumberton Work Unit: Sonny Sampson, Plant Pest Inspector, Federally funded
Elizabethtown Work Unit: Rondy Godwin, Plant Pest Inspector, Federally funded
Clinton Work Unit: Earl Brewington, Plant Pest Inspector, Federally funded

Witchweed Plant Pest Aides (Personnel assist Plant Pest Inspectors in conducting all field activities in each of the work units)
Richard Smith, Plant Pest Aide, Federally funded
Cleveland Chavis, Plant Pest Aide, Federally funded

Witchweed Project Support:

Dustin Mercer, Mechanic II, Federally funded
Jerry Johnson, Mechanic I, Federally funded

Aquatic Dealer Inspections

Aquatic dealer inspections are completed each year by the Plant Protection Specialists. In 2008, 129 potential aquatic plant dealers were inspected in the following 34 counties (the number in parenthesis is the number of dealers in the county): Beaufort (1), Bladen (1), Brunswick (2), Cabarrus (1), Caldwell (1), Cateret (11), Cherokee (2), Clay (2), Craven (9), Cumberland (16), Dare (1), Davidson (1), Duplin (8), Forsyth (8), Gaston (3), Graham (1), Haywood (2), Henderson (2), Jackson (2), Jones (1), Lenoir (8), Lincoln (1), Macon (2), Martin (1), Mecklenburg (10), New Hanover (6), Onslow (10), Pasquotank (3), Perquimans (1), Pitt (4), Rowan (2), Sampson (3), Stanly (1), Wake (2).

Nineteen of the 129 potential aquatic dealers had no aquatic plants, 16 were now out of business and 94 had no problems or violations. As part of the inspection process, the plant protection specialists also advised dealers to inform customers about the importance of not disposing of aquatic plants such as water hyacinth, parrot feather and water lettuce into outdoor water bodies.

Accomplishments: Seed and Fertilizer Section

The mission of the Seed and Fertilizer Section is to improve the profitability and sustainability of agriculture in the state by ensuring the seed, fertilizer, lime, and other soil additives offered for sale in North Carolina meet prescribed standards and are properly labeled.

The mission of this section is accomplished by:

- Ensuring that all locations that offer seed, commercial fertilizers, agricultural liming materials, landplaster, and soil additives for sale in the state are registered.
- Implementing a sound regulatory compliance program by conducting inspections and sampling of seed and fertilizer offered for sale in the state.
- Implementing seed purity, germination, and other specialized laboratory tests in support of the seed regulatory and service programs.
- Implementing a joint federal/state administered biotechnology permitting and inspection program.
- Conducting the fertilizer bioassay and endophyte testing programs.
- Coordinating activities of the N.C. Seed Board such that complaints regarding the failure of agricultural or vegetable seed to produce or perform as labeled or warranted are heard and responses are provided.

The Seed and Fertilizer Section includes 26 staff members with responsibilities and accountability for administrative, field services and North Carolina Seed Lab functions of the unit. The total budget for the Seed and Fertilizer Program for 2008-09 was $1,904,606, including a state appropriation of $964,860 and revenues of $939,746. Revenues included receipts from registrations fees and penalties issued for non-compliance. Each staff member is highly trained for the specialized work duties performed by this Section. During this fiscal year, all field staff were required to participate in agency sponsored training related to the implementation of a pilot biotechnology inspection program. North Carolina Seed Laboratory staff participated in individual mentored training or training sponsored by the Federal Seed Laboratory, Gastonia.

For fiscal year 2008-09, Seed and Fertilizer Section staff provided a number of services critical to the producers and citizens of this state. Program staff were responsible for registering and issuing licenses for all locations that offered seed, commercial fertilizers, agricultural liming materials, landplaster, and soil additives for sale in the state. For this fiscal year, 4,279 Seed Dealer licenses were issued. Seed dealers include those locations that offer wholesale and retail seed for sale. For the period, 303 Fertilizer Licenses were issued. Fertilizer licenses must be obtained for those individuals or businesses manufacturing or distributing fertilizer in the state.

Seed and Fertilizer Field Staff are responsible for conducting inspections and sampling seed and fertilizer offered for sale

2008-09 Seed and Fertilizer Program-Inspection and Regulatory Activities

Number of Seed and Fertilizer Dealer Visits: 7,907

Seed and Fertilizer Samples collected
- **Official Seed Samples: 3,144 (50,542 lots)**
- **Official Fertilizer/Lime Samples: 2,399 (30,748 lots)**

Regulatory Compliance Program
- **Seed Stop Sales Issued: 40**
- **Seed Stop Sales Issued and Resolved on Site: 2,101**
- **Seed Stop Sales (N.C. Seed Lab): 199**
- **Fertilizer Stop Sales Issued: 22**
- **Fertilizer Stop Sales Issued and Resolved on Site: 81**

in the state. The staff also implemented a regulatory program to ensure full compliance with laws and regulations. An overview of program accomplishments is provided to the right.

Seed and Fertilizer Field Staff also provided support to the N.C. Department of Transportation by sampling 358 seed lots to be utilized on highway projects. The lab tests performed on these seed lots detected several violations and as such remain a critical part of the program.

The North Carolina Seed Laboratory is responsible for providing laboratory support for both the regulatory and service areas including the state's seed dealers, producers, university researchers and consumers. The work of this laboratory provides critical seed testing data needed to make management decisions regarding seed stock and for labeling purposes. For 2008-09, the North Carolina Seed Laboratory conducted 4,215 regulatory seed tests and 7,179 service seed tests. These tests accounted for required testing involving purity and germination. Additional special tests included tetrazolium, accelerated aging, cool test of cotton, cold test of hybrid corn, phenol, Round-up Ready™ tolerance, sand, and moisture testing. There were 702 special tests conducted during the fiscal year. The Seed and Fertilizer Section continued to implement the endophyte testing service. A number of grasses, including tall fescue and perennial ryegrass, contain a fungal endophyte which has a beneficial relationship with the grass host. The tall fescue endophyte, *Neotyphodium coenophialum* (previously *Acremonium coenophialum*), lives exclusively inside plants, and can only be detected through laboratory analysis. This endophyte has been proven to give the grass insect, disease and mammal resistance. Though very beneficial to tall fescue plants, this endophyte produces chemicals which are toxic to a variety of animals. In North Carolina, fescue toxicosis is especially a problem in horses and cattle. A total of 25 pasture samples were processed for producers. This section also implements a small fertilizer bioassay program. The primary objective of this program is to identify any potential for herbicide contamination in fertilizers offered for sale in the state. A total of 141 samples were taken and tests were conducted on 48. All samples were negative for herbicide contamination.

The North Carolina Seed Laboratory and its staff remain active in the activities of the Association of Official Seed Analysts (AOSA) and the Association of American Seed Control Officials (AASCO). At the state level, program staff remain active in the N.C. Seedsmen's Association (NCSA) and the N.C. Crop Improvement Association (NCCIA). Laboratory staff continued to provide information regarding the services offered through the lab by providing briefings for six NCSU classes and a single class for Lenoir Community College. During these classes, background information on seed production, seed testing, seed regulatory and seed pathology was provided. Tours of the North Carolina Seed Laboratory were provided to several groups, including a tour for private seed laboratory staff from BASF.

Seed and Fertilizer Section Staff worked with USDA, Biotechnology and Regulatory Services (BRS) to jointly administer a federal/state biotechnology and permitting program. Primary responsibilities included reviewing permits and acknowledgements provided through USDA, Biotechnology and Regulatory Services (BRS) for laboratory, greenhouse, and field tests of genetically engineered crops. For this period, NCDA&CS' staff reviewed a total of 262

acknowledgements and 36 permits. A pilot project was also initiated during this period that involved the Seed and Fertilizer Specialists with inspections of *Notification and Permit Release Sites*, including pharmaceutical/industrial trials. As a prerequisite for participation in the project, all field staff were required to participate in training focusing on work flow, confidential business information, and steps in effectively completing a field inspection.

The scope of the N.C. Seed Board is to review complaints from individuals who may have suffered damage from the failure of agricultural or vegetable seed to perform as labeled or warranted, or as a result of negligence. Such performance issues related to seed purity, seed germination, varietal purity, lot number of other lot identification, percent weeds, inert material, other crop seed and test date. For this period, there were five complaints raised; however, resolution was obtained prior to N.C. Seed Board consideration.

The Tobacco Variety Evaluation Program continued in joint cooperation with N.C. State University. Samples from 38 flue-cured tobacco seed lots were obtained for planting grow-outs in the variety testing program. All seed lots tested were found truthfully labeled as to variety and recommended for sale by the committee.

Seed and Fertilizer Staff worked with Departmental staff to make needed text changes to the N.C. Seed Law providing compliance with recommendations outlined by the Association of American Seed Control Officials. Along with these changes, recommendations for fee increases and consolidations of seed dealer categories were made. These included an increase in the wholesale or combined wholesale and retail seed dealer from $100 to $125. Other retail seed dealer categories were combined with a new fee of $30. The N.C. General Assembly approved each of the changes with an effective date of October 1, 2009.

Seed and Fertilizer Staff continued work on the development of Bulk Compost Regulations. Two general meetings were conducted with industry and university staff to receive input and feedback on the potential for such regulations. Based on the input received, Plant Industry Division Staff are moving ahead with the development of a draft set of regulations for internal review.

Seed and Fertilizer Staff remain actively involved in the Association of American Plant Food Control Officials (AAPFCO) and the Plant Food Association of NC (PFANC) and work jointly to provide uniform legislation, effective analytical methods, labeling, and in promoting effective fertilizer products. Nationally, the trends show additional consolidation in the industry, thus creating larger companies. For the period, early producer purchases of fertilizer products were slow given earlier higher prices. Producers did seek other alternatives to traditional fertilizers including animal and poultry waste materials. The following two tables below provide details on fertilizer and lime/lime plaster reported, sampled and percent analyzed.

Table 1: Data of fertilizer samples analyzed for the current and previous fiscal years

FERTILIZER SAMPLING AND TONNAGE						
Year	#Samples	#Compliant	%Compliant	Tonnage Reported	Tonnage Sampled	%Sampled
2008-09	1.484	1,069	72.52	1,073,286	35,598	3.32
2007-08	2,507	2,186	87.20	1,477,235	70,326	4.76
2006-07	2,473	1,900	76.80	1,605,642	37,259	2.30
2005-06	2,448	1,816	74.10	1,511,419	37,253	2.46
2004-05	2,662	2,065	77.57	1,400,426	44,352	3.17
2003-04	2,773	2,019	72.81	1,591,225	50,458	3.17
2002-03	3,468	2,621	75.58	1,399,516	299,488	21.39

Table 2: Data of liming material and landplaster samples analyzed for the current and previous fiscal years

LIME SAMPLING AND TONNAGE						
Year	#Samples	#Compliant	%Compliant	Tonnage Reported	Tonnage Sampled	%Sampled
2008-09	871	720	82.66	687,605	43,295	6.3
2007-08	439	268	61.04	620,469	84,124	13.56
2006-07	1,379	807	58.50	760,637	39,009	5.10
2005-06	1,021	805	78.80	914.990	48,200	5.27
2004-05	1,114	959	59.16	784,620	60,885	7.76
2003-04	719	613	85.26	787,186	31,793	4.04
2002-03	770	618	80.26	695,564	112,286	16.00